

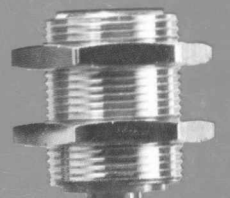
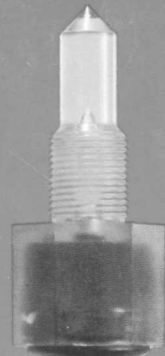
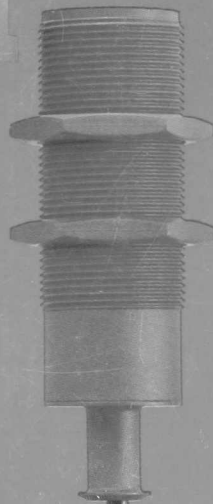
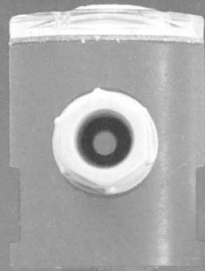


SENSORS

INDUCTIVE - CAPACITIVE - LEVEL - PHOTO - TEMPERATURE ETC.

Denner

Denner





This new catalogue on accessories together with a new S-system catalogue replace our eight previous S-system catalogues. This innovation should facilitate your survey of our entire range of accessories and S-systems now covering more than sixty main functions.

The Electromatic accessories and S-system modules cover a wide spectrum of various applications for monitoring and automating industrial processes.

Most electronic control problems can be easily solved through this and the S-system catalogue offering well-arranged electronic controls that are easy to install and operate.

Most accessories can be used in conjunction with S-systems (M-systems, T-systems or Countomatic), and some are fitted with relay- or semiconductor output and can therefore work independently.

Electromatic's extensive network of subsidiaries and authorized agents will give you the required technical support and secure fast product availability.

ELECTROMATIC is situated in a modern manufacturing complex now covering 17.000 m² in Hadsten, Denmark.

We wish to welcome you among our ever increasing number of ELECTROMATIC customers.

ELECTROMATIC

Proximity sensors	Inductive
	Capacitive
	Optical
Level sensors	Conductive
	Capacitive
	Optical
Photosensors	Unmodulated light
	Modulated light
	With relay/NPN
Current transformers	
Pressure transducers	
Temperature sensors	
Gas detectors	
Wind metering equipment	
Various accessories	

CONTENTS:

PAGES

1. Index: From function to type and page number. 2- 5
2. Index: From type number (in alphanumeric order) to function. 6- 8
3. Specified description in order according to function. ... 11-66
4. Brief description of other ELECTROMATIC products. ... 67-68
5. (back cover:) ELECTROMATIC subsidiaries.

FUNCTION

TYPE No.

PAGE

PROXIMITY SENSORS

INDUCTIVE SENSORS

NAMUR – DIN 19234 (WITHOUT AMPLIFIER)

I-shaped. Maximum sensing distance: 0.5 mm.
I-shaped. Maximum sensing distance: 1 mm.

DJ 0.5 11
DJ 1 11

I-shaped. Maximum sensing distance: 2 mm.
I-shaped. Maximum sensing distance: 2 mm. With thread.

DJ 2 11
DJ 2 G 11

I-shaped. Maximum sensing distance: 5 mm.
I-shaped. Maximum sensing distance: 5 mm. With thread.

DJ 5 12
DJ 5 G 12

I-shaped. Maximum sensing distance: 6 mm.
I-shaped. Maximum sensing distance: 6 mm. With thread.

DJ 6 12
DJ 6 G 12

I-shaped. Maximum sensing distance: 10 mm.
I-shaped. Maximum sensing distance: 10 mm. With thread.

DJ 10 12
DJ 10 G 12

I-shaped. Maximum sensing distance: 25 mm. With mounting holes.
I-shaped. Maximum sensing distance: 40 mm. With mounting holes.

DJ 25 13
DJ 40 13

U-shaped. Gap: 3.5 mm.
U-shaped. Gap: 5 mm.

DU 3.5 14
DU 5 14

U-shaped. Gap: 6 mm.
U-shaped. Gap: 10 mm.

DU 6 14
DU 10 14

O-shaped. Hole diameter: 11 mm.
O-shaped. Hole diameter: 17 mm.
O-shaped. Hole diameter: 34 mm.

DO 11 15
DO 17 15
DO 34 15

WITH AMPLIFIER (TRANSISTOR OUTPUT)

I-shaped. Maximum sensing distance: 2 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 2 mm. NPN, normally open. Thread

DJ 2 E 16
DJ 2 GE 16

I-shaped. Maximum sensing distance: 5 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 5 mm. NPN, normally open. Thread.

DJ 5 E 17
DJ 5 GE 17

I-shaped. Maximum sensing distance: 6 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 6 mm. NPN, normally open. Thread.

DJ 6 E 17
DJ 6 GE 17

I-shaped. Maximum sensing distance: 10 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 10 mm. NPN, normally open. Thread.

DJ 10 E 17
DJ 10 GE 17

I-shaped. Maximum sensing distance: 10 mm. PNP, normally open.
I-shaped. Maximum sensing distance: 10 mm. PNP, normally open. Thread.

DJ 10 EP 17
DJ 10 GEP 17

I-shaped. Maximum sensing distance: 25 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 40 mm. NPN, normally open.

DJ 25 E 18
DJ 40 E 18

U-shaped. Gap: 6 mm. NPN, normally open.
U-shaped. Gap: 10 mm. NPN, normally open.

DU 6 E 16
DU 10 E 16

O-shaped. Hole diameter: 17 mm. NPN, normally open.
O-shaped. Hole diameter: 34 mm. NPN, normally open.

DO 17 E 18
DO 34 E 18

AC SUPPLY, 2-CORE (THYRISTOR OUTPUT)

I-shaped. Maximum sensing distance: 10 mm. Normally open.
I-shaped. Maximum sensing distance: 10 mm. Normally open. Thread.

DJ 10 T 19
DJ 10 GT 19

I-shaped. Maximum sensing distance: 10 mm. Normally closed.
I-shaped. Maximum sensing distance: 10 mm. Normally closed. Thread.

DJ 10 TI 19
DJ 10 GTI 19

CAPACITIVE SENSORS

NAMUR – DIN 19234 (WITHOUT AMPLIFIER)

I-shaped. Maximum sensing distance: 3 mm.
I-shaped. Maximum sensing distance: 3 mm. With thread.

DR 3 20
DR 3 G 20

I-shaped. Maximum sensing distance: 6 mm.
I-shaped. Maximum sensing distance: 6 mm. With thread.

DR 6 20
DR 6 G 20

I-shaped. Maximum sensing distance: 10 mm.
I-shaped. Maximum sensing distance: 10 mm. With thread.

DR 10 20
DR 10 G 20

WITH AMPLIFIER (TRANSISTOR OUTPUT)

I-shaped. Maximum sensing distance: 3 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 3 mm. NPN, normally open. Thread.

DR 3 E 21
DR 3 GE 21

I-shaped. Maximum sensing distance: 6 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 6 mm. NPN, normally open. Thread.

DR 6 E 22
DR 6 GE 22

I-shaped. Maximum sensing distance: 10 mm. NPN, normally open.
I-shaped. Maximum sensing distance: 10 mm. NPN, normally open. Thread.

DR 10 E 23
DR 10 GE 23

I-shaped. Maximum sensing distance: 10 mm. NPN, normally closed.

DR 10 EI 23

I-shaped. Maximum sensing distance: 10 mm. PNP, normally open.
I-shaped. Maximum sensing distance: 10 mm. PNP, normally open. Thread.

DR 10 EP 23
DR 10 GEP 23

FUNCTION

TYPE No.

PAGE

PROXIMITY SENSORS

AC SUPPLY, 2-CORE (THYRISTOR OUTPUT)

I-shaped. Maximum sensing distance: 10 mm.	Normally open.	DR 10 T	24
I-shaped. Maximum sensing distance: 10 mm.	Normally open. Thread.	DR 10 GT	24
I-shaped. Maximum sensing distance: 10 mm.	Normally closed.	DR 10 TI	24
I-shaped. Maximum sensing distance: 10 mm.	Normally closed. Thread.	DR 10 GTI	24

OPTICAL SENSORS

WITH AMPLIFIER (TRANSISTOR OUTPUT)

I-shaped. Adjustable sensing distance max. 150 mm. NPN, normally open	DP 10 E	25
I-shaped. Adjustable sensing distance max. 150 mm. NPN, normally open. Thread.	DP 10 GE	25
I-shaped. Adjustable sensing distance max. 150 mm. NPN, normally closed.	DP 10 EI	25
I-shaped. Adjustable sensing distance max. 150 mm. NPN, normally closed. Thread.	DP 10 GEI	25
I-shaped. Adjustable sensing distance max. 150 mm. PNP, normally open.	DP 10 EP	25
I-shaped. Adjustable sensing distance max. 150 mm. PNP, normally open. Thread.	DP 10 GEP	25

AC SUPPLY, 2-CORE (THYRISTOR OUTPUT)

I-shaped. Adjustable sensing distance max. 150 mm. Normally open.	DP 10 T	26
I-shaped. Adjustable sensing distance max. 150 mm. Normally open. Thread.	DP 10 GT	26
I-shaped. Adjustable sensing distance max. 150 mm. Normally closed.	DP 10 TI	26
I-shaped. Adjustable sensing distance max. 150 mm. Normally closed. Thread.	DP 10 GTI	26

LEVEL SENSORS (for S-SYSTEMS type SV)

LEVEL PROBES (for conductive liquids)

Hanging electrode. Nylon/Stainless steel.	VH 1	27
Hanging electrode. Nylon/Stainless steel. Insulated.	VH 2	27
Screw fixing. 1 electrode. PVC/Coated stainless steel.	VPC 1-0.5	27
Screw fixing. 2 electrodes. PVC/Coated stainless steel.	VPC 2-0.5	27
Screw fixing. 1 electrode. PVC/Coated stainless steel.	VPC 1-1.0	27
Screw fixing. 2 electrodes. PVC/Coated stainless steel.	VPC 2-1.0	27
Screw fixing. 3 electrodes. PVC/Coated stainless steel.	VPC 3-1.0	27
Screw fixing. 1 electrode. Polypropylene/Coated stainless steel.	VPP 1-0.5	27
Screw fixing. 2 electrodes. Polypropylene/Coated stainless steel.	VPP 2-0.5	27
Screw fixing. 1 electrode. Polypropylene/Coated stainless steel.	VPP 1-1.0	27
Screw fixing. 2 electrodes. Polypropylene/Coated stainless steel.	VPP 2-1.0	27
Screw fixing. 3 electrodes. Polypropylene/Coated stainless steel.	VPP 3-1.0	27
Screw fixing. 1 electrode. Nylon/Stainless steel.	VN 1-1.5	28
Screw fixing. 2 electrodes. Nylon/Stainless steel.	VN 2-1.5	28
Screw fixing. 3 electrodes. Nylon/Stainless steel.	VN 3-1.5	28
Screw fixing. 1 electrode. Teflon/Stainless steel.	VT 1-1.5	28
Screw fixing. 2 electrodes. Teflon/Stainless steel.	VT 2-1.5	28
Screw fixing. 3 electrodes. Teflon/Stainless steel.	VT 3-1.5	28
For the food industry. 2 electrodes. Stainless steel/Coated stainless steel.	VS 2	28
Level sensor for swimming pools a.o. For S-system SV 180/SV 280.	VJ 1	29

CAPACITIVE SENSORS (for solid, fluid or granulated substances)

Hanging sensor, I-shaped. Nylon.	Sensing distance: 4- 6 mm.	VR 1 A	29
Hanging sensor, I-shaped. Nylon.	Sensing distance: 8-12 mm.	VR 1 B	29
Screw in sensor, I-shaped. Nylon.	Sensing distance: 4- 6 mm.	VR 2 A	29
Screw in sensor, I-shaped. Nylon.	Sensing distance: 8-12 mm.	VR 2 B	29
Screw in sensor, I-shaped. Nylon.	Sensing distance: 4- 6 mm.	VR 3 A	29
Screw in sensor, I-shaped. Polyester.	Sensing distance: 8-12 mm.	VRY 2 B	29

OPTICAL SENSORS (for liquids)

With unmodulated IR light. Transistor output OFF when sensor tip in liquid.	VP 1 E	30
With unmodulated IR light. Transistor output ON when sensor tip in liquid.	VP 2 E	30
With modulated IR light. Transistor output OFF when sensor tip in liquid.	VP 1 EM	31
With modulated IR light. Transistor output ON when sensor tip in liquid.	VP 2 EM	31

FUNCTION	TYPE No.	PAGE
PHOTOSENSORS – INFRARED LIGHT		
WITH UNMODULATED LIGHT (for SE 100/SE 105)		
Separate transmitter and receiver.	Maximum operating distance: 20 cm.	ITR 0.2 32
Separate transmitter and receiver, with brackets.	Maximum operating distance: 20 cm.	ITRA 0.2 32
Combined transmitter/receiver.	Maximum operating distance: 3 cm.	IRE 0.03 32
WITH MODULATED LIGHT (for SE 110)		
Separate transmitter and receiver		
Lens aperture: Axial.	Maximum operating distance: 5 metres.	MATR 5 33
Lens aperture: Axial.	Maximum operating distance: 10 metres.	MATR 10 33
Lens aperture: Axial.	Maximum operating distance: 20 metres.	MATR 20 33
Lens aperture: Perpendicular.	Maximum operating distance: 5 metres.	MBTR 5 34
Lens aperture: Perpendicular.	Maximum operating distance: 10 metres.	MBTR 10 34
Lens aperture: Perpendicular.	Maximum operating distance: 20 metres.	MBTR 20 34
Lens aperture: Axial.	Maximum operating distance: 2.5 metres.	MCTR 2.5 35
Lens aperture: Axial.	Maximum operating distance: 5 metres.	MCTR 5 35
Lens aperture: Axial.	Maximum operating distance: 10 metres.	MCTR 10 35
Lens aperture: Perpendicular.	Maximum operating distance: 2.5 metres.	MDTR 5 36
Lens aperture: Perpendicular.	Maximum operating distance: 5 metres.	MDTR 5 36
Lens aperture: Perpendicular.	Maximum operating distance: 10 metres.	MDTR 10 36
Lens aperture: Perpendicular.	Maximum operating distance: 50 metres.	METR 50 38
Lens aperture: Perpendicular.	Maximum operating distance: 100 metres.	METR 100 38
Lens aperture: Perpendicular.	Maximum operating distance: 1 metre.	MFATR 1 40
Lens aperture: Axial.	Maximum operating distance: 1 metre.	MFTR 1 44
Combined transmitter/receiver (transceiver)		
Lens aperture: Perpendicular.	Maximum operating distance: 1 metre.	MFAD 1 41
Lens aperture: Perpendicular.	Maximum operating distance: 1 metre.	MFBD 1 41
Lens aperture: Axial.	Maximum operating distance: 1 metre.	MFCD 1 42
Lens aperture: Axial.	Maximum operating distance: 1 metre.	MFD 1 43
Lens aperture: Axial.	Maximum operating distance: 2 metres.	MFD 2 43
Lens aperture: Perpendicular.	Maximum operating distance: 10 metres.	MED 10 37
Lens aperture: Perpendicular. Object reflection.	Maximum operating distance: 10 metres.	MED 10 A 37
WITH MODULATED LIGHT, AMPLIFIER, OUTPUT RELAY/TRANSISTOR		
Separate transmitter and receiver		
AC supply. Relay output.	Maximum operating distance: 10 metres.	METRM 10 39
Combined transmitter/receiver (transceiver)		
DC/AC supply. Relay output.	Maximum operating distance: 6 metres.	MGDM 6 45
DC/AC supply. Relay output. Object reflection.	Maximum operating distance: 1 metre.	MGDM 6 A 46
DC/AC supply. Transistor output.	Maximum operating distance: 6 metres.	MGDM 6 E 45
DC/AC supply. Transistor output. Object reflection.	Maximum operating distance: 1 metre.	MGDM 6 AE 46
CURRENT TRANSFORMERS		
AC 1-phased current metering transformers.	Current range: 0.5–500 A.	MI 49
AC 3-phased current metering transformers.	Current range: 1 –500 A.	MI 50
AC 3-phased current metering transformers.	Current range: 0.5–500 A.	MP 50
AC 1-phased through-primary current transformers. Prim.: 50–200 A. Sec.: 1/5 A.		CT3A 47–48
DC Current metering transformers.	Current range: 2–500 A.	JD 49
PRESSURE TRANSDUCERS		
Solid state pressure transducers for gases/liquids. Range: 0–30 psi (0–2.0 bar).		JP 51

INDEX

FUNCTION — TYPE No.

FUNCTION

TYPE No.

PAGE

TEMPERATURE SENSORS

NTC sensor for liquids.	Range: -25°C to +150°C.	ETS 1.1	52
NTC sensor for liquids. Teflon.	Range: -25°C to +150°C.	ETS 1.2	52
NTC sensor for liquids.	Range: +100°C to +250°C.	ETS 2.1	52
NTC sensor for liquids. Teflon.	Range: +100°C to +250°C.	ETS 2.2	52
NTC sensor for air.	Range: +5°C to +60°C.	ETS 3	53
3-wire semiconductor sensors for liquids.	Range: -20°C to +120°C.	ETS	54
3-wire semiconductor sensors for air.	Range: -20°C to +60°C.	ETS	54
3-wire semiconductor sensors for surfaces.	Range: -20°C to +120°C.	ETS	54
2-wire semiconductor sensors for liquids.	Range: -20°C to +120°C.	ETR	55
2-wire semiconductor sensors for air.	Range: -20°C to +60°C.	ETR	55
2-wire semiconductor sensors for surfaces.	Range: -20°C to +120°C.	ETR	55
Compensating link with cable glands for thermocouple sensors.		ETC 1	56

GAS DETECTORS (for SH 115)

Gas detector sensitive to e.g. propane, butane, methane (natural gas).	HG 10	57
Gas detector sensitive to toxic gases and smoke.	HG 20	57

WIND METERING (for SO 115/SP 115)

Anemometer for wind speed metering.	Range: 2-30 metres/sec.	PV 01	58
Wind vane for relative wind direction.	Control range: $\pm 7^\circ$.	OD 02	59

ACCESSORIES

FOR PROBES/SENSORS (pages 11-31)

Nuts with 1/2", 1", or 1 1/2" pipe thread for level probes.
Cap of polypropylene for level probe type VPP.
Mounting bracket for some sensors without thread.

VM 60
PPH 60
DB 1 60

FOR PHOTOSENSORS (pages 32-46)

Power supply for transmitters.

SE 010 61

For MGDM-types: Front mounting bezel.

For MGDM-types: Angle bracket.

For MGDM-types: Ball-and-socket joint mounting bracket.

FRF 1 61
VB 2 61
KB 2 62

For MED/METR/METRM: Ball-and-socket joint mounting bracket.

Reflectors. 6 types: Circular or quadrangular.

KB 1 62
ER 62

FOR TEMPERATURE SENSORS (pages 52-56)

Screw-in pipe of brass. External 1/2" pipe thread.

Moving-coil instruments for the indication of temperature.

ETO 55
ID/IDM 55

FOR S-SYSTEMS

Digital Timer Control (D.T.C.)

Measuring instrument for some S-system timers/recyclers. LED display.

Measuring instrument for some S-system timers/recyclers. LCD display. Battery.

CL 4010 63
CL 3520 63

Assemblies

Bases. 10 types of 8-pole/11-pole bases. e.g. S 411.

Hold down spring. For additional fixing of S-systems.

Mounting rack. For mounting of up to 27 S-systems.

Base covers. 2 types: Cover of bases type S 408, S 411/terminals.

Front mounting bezel. For panel mounting of S-systems.

Potentiometer lock.

S 64
HF 65
SM 13 65
BB 65
FRS 2 64
PL 1 65

Miscellaneous accessories

Transformers. For up to 40 S-systems. Primary: 220/380 VAC.

Remote potentiometer kit. For panel mounting.

Instruments. For indication of current, voltage, revolutions, wind speed etc.

ST 66
PK 66
ID/IDM 66

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TYPE No. — FUNCTION

TYPE No.	PAGE	FUNCTION
BB 1	65	Cover for terminals of bases, type S 108, S 111, S 108 A, S 111 A.
BB 4	65	Cover for bases, type S 408, S 411.
CL 3520	63	Digital timer Control (D.T.C.). Measuring instrument for some S-system timers/recyclers.
CL 4010	63	Digital Timer Control (D.T.C.). Measuring instrument for some S-system timers/recyclers.
CT 3 A	47-48	Through-primary current transformers, 1-phased AC. Primary current 50-200 A.
DB 1	60	Mounting bracket for proximity sensors with the type number 10 without thread.
DJ 0.5	11	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 0.5 mm.
DJ 1	11	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 1 mm.
DJ 2	11	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 2 mm.
DJ 2 E	16	Inductive sensor with amplifier (24 VDC). I-shaped. Maximum distance: 2 mm.
DJ 2 G	11	Inductive sensor without amplifier (NAMUR). I-shaped. With thread. Maximum distance: 2 mm.
DJ 2 GE	16	Inductive sensor with amplifier (24 VDC). I-shaped. With thread. Maximum distance: 2 mm.
DJ 5	12	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 5 mm.
DJ 5 E	17	Inductive sensor with amplifier (24 VDC). I-shaped. Maximum distance: 5 mm.
DJ 5 G	12	Inductive sensor without amplifier (NAMUR). I-shaped. With thread. Maximum distance: 5 mm.
DJ 5 GE	17	Inductive sensor with amplifier (24 VDC). I-shaped. With thread. Maximum distance: 5 mm.
DJ 6	12	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 6 mm.
DJ 6 E	17	Inductive sensor with amplifier (24 VDC). I-shaped. Maximum distance: 6 mm.
DJ 6 G	12	Inductive sensor without amplifier (NAMUR). I-shaped. With thread. Maximum distance: 6 mm.
DJ 6 GE	17	Inductive sensor with amplifier (24 VDC). I-shaped. With thread. Maximum distance: 6 mm.
DJ 10	12	Inductive sensor without amplifier (NAMUR). I-shaped. Maximum distance: 10 mm.
DJ 10 E	17	Inductive sensor with amplifier (24 VDC). I-shaped. Maximum distance: 10 mm.
DJ 10 EP	17	Inductive sensor with amplifier (24 VDC). I-shaped. Maximum distance: 10 mm.
DJ 10 G	12	Inductive sensor without amplifier (NAMUR). I-shaped. With thread. Maximum distance: 10 mm.
DJ 10 GE	17	Inductive sensor with amplifier (24 VDC). I-shaped. With thread. Maximum distance: 10 mm.
DJ 10 GEP	17	Inductive sensor with amplifier (24 VDC). I-shaped. With thread. Maximum distance: 10 mm.
DJ 10 GT	19	Inductive sensor, 2-core for 90-240 VAC. I-shaped. With thread. Maximum distance: 10 mm.
DJ 10 GTI	19	As DJ 10 GT but with inverted function. I-shaped. With thread. Maximum distance: 10 mm.
DJ 10 T	19	Inductive sensor, 2-core for 90-240 VAC. I-shaped. Maximum distance: 10 mm.
DJ 10 TI	19	As DJ 10 T but with inverted function. I-shaped. Maximum distance: 10 mm.
DJ 25	13	Inductive sensor without amplifier (NAMUR). With mounting bracket. Maximum distance: 25 mm.
DJ 25 E	18	Inductive sensor with amplifier (24 VDC). With mounting bracket. Maximum distance: 25 mm.
DJ 40	13	Inductive sensor without amplifier (NAMUR). With mounting bracket. Maximum distance: 40 mm.
DJ 40 E	18	Inductive sensor with amplifier (24 VDC). With mounting bracket. Maximum distance: 40 mm.
DO 11	15	Inductive sensor without amplifier (NAMUR). O-shaped. Hole diameter: 11 mm.
DO 17	15	Inductive sensor without amplifier (NAMUR). O-shaped. Hole diameter: 17 mm.
DO 17 E	18	Inductive sensor with amplifier (24 VDC). O-shaped. Hole diameter: 17 mm.
DO 34	15	Inductive sensor without amplifier (NAMUR). O-shaped. Hole diameter: 34 mm.
DO 34 E	18	Inductive sensor with amplifier (24 VDC). O-shaped. Hole diameter: 34 mm.
DP 10 E	25	Optical proximity sensor. NPN transistor output. Maximum distance: 15 cm.
DP 10 EI	25	Optical proximity sensor. NPN transistor output. Inverted. Maximum distance: 15 cm.
DP 10 EP	25	Optical proximity sensor. PNP transistor output. Maximum distance: 15 cm.
DP 10 GE	25	Optical proximity sensor. NPN transistor output. Maximum distance: 15 cm.
DP 10 GEI	25	Optical proximity sensor. NPN transistor output. Inverted. With thread. Maximum distance: 15 cm.
DP 10 GEP	25	Optical proximity sensor. PNP transistor output. With thread. Maximum distance: 15 cm.
DP 10 GT	26	Optical proximity sensor. 2-core for 90-240 VAC. With thread. Maximum distance: 15 cm.
DP 10 GTI	26	Optical proximity sensor. 2-core for 90-240 VAC. Inverted. With thread. Maximum distance: 15 cm.
DP 10 T	26	Optical proximity sensor. 2-core for 90-240 VAC. Maximum distance: 15 cm.
DP 10 TI	26	Optical proximity sensor. 2-core for 90-240 VAC. Inverted. Maximum distance: 15 cm.
DR 3	20	Capacitive proximity sensor without amplifier (NAMUR). Maximum distance: 3 mm.
DR 3 E	21	Capacitive proximity sensor with amplifier. Maximum distance: 3 mm.
DR 3 G	20	Capacitive proximity sensor without amplifier (NAMUR). With thread. Maximum distance: 3 mm.
DR 3 GE	21	Capacitive proximity sensor with amplifier. With thread. Maximum distance: 3 mm.
DR 6	20	Capacitive proximity sensor without amplifier (NAMUR). Maximum distance: 6 mm.
DR 6 E	22	Capacitive proximity sensor with amplifier. Maximum distance: 6 mm.
DR 6 G	20	Capacitive proximity sensor without amplifier (NAMUR). With thread. Maximum distance: 6 mm.
DR 6 GE	22	Capacitive proximity sensor with amplifier. With thread. Maximum distance: 6 mm.
DR 10	20	Capacitive proximity sensor without amplifier (NAMUR). Maximum distance: 10 mm.
DR 10 E	23	Capacitive proximity sensor with amplifier. Maximum distance: 10 mm.
DR 10 EI	23	Capacitive proximity sensor with amplifier. Inverted. Maximum distance: 10 mm.
DR 10 EP	23	Capacitive proximity sensor with amplifier. PNP transistor. Maximum distance: 10 mm.
DR 10 G	20	Capacitive proximity sensor without amplifier (NAMUR). With thread. Maximum distance: 10 mm.
DR 10 GE	23	Capacitive proximity sensor with amplifier. With thread. Maximum distance: 10 mm.
DR 10 GEI	23	Capacitive proximity sensor with amplifier. Inverted. With thread. Maximum distance: 10 mm.
DR 10 GEP	23	Capacitive proximity sensor with amplifier. PNP transistor. With thread. Maximum distance: 10 mm.

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TYPE No. — FUNCTION

TYPE No.	PAGE	FUNCTION		
DR 10 GT	24	Capacitive proximity sensor. 2-core for 90–240 VAC.	With thread.	Maximum distance: 10 mm
DR 10 GTI	24	Capacitive proximity sensor. 2-core for 90–240 VAC.	Inverted. With thread.	Maximum distance: 10 mm
DR 10 T	24	Capacitive proximity sensor. 2-core for 90–240 VAC.		Maximum distance: 10 mm
DR 10 TI	24	Capacitive proximity sensor. 2-core for 90–240 VAC.	Inverted.	Maximum distance: 10 mm
DU 3.5	14	Inductive sensor without amplifier (NAMUR, DIN 19234).	U-shaped.	Gap: 3.5 mm.
DU 5	14	Inductive sensor without amplifier (NAMUR, DIN 19234).	U-shaped.	Gap: 5 mm.
DU 6	14	Inductive sensor without amplifier (NAMUR, DIN 19234).	U-shaped.	Gap: 6 mm.
DU 6 E	16	Inductive sensor with amplifier (3-core for 12–24 VDC).	U-shaped.	Gap: 6 mm.
DU 10	14	Inductive sensor without amplifier (NAMUR, DIN 19234).	U-shaped.	Gap: 10 mm.
DU 10 E	16	Inductive sensor with amplifier (3-core for 12–24 VDC).	U-shaped.	Gap: 10 mm.
ER	62	Reflectors in 6 different sizes for use in conjunction with photosensors.		
ETC 1	56	Compensating link for thermocouple sensors. (S-system ST 155, ST 165.)		
ETO	55	Screw-in pipe with external thread for some temperature sensors.		
ETR 6.1 a	55	Temperature sensor for liquids.	PTC resistance sensor.	Temperature range: – 20 to +120°C.
ETR 6.2.a	55	Temperature sensor for liquids.	PTC resistance sensor.	Temperature range: – 20 to +120°C.
ETR 7 a	55	Temperature sensor for air.	PTC resistance sensor.	Temperature range: – 20 to + 60°C.
ETR 9 a	55	Temperature sensor for liquids.	PTC resistance sensor.	Temperature range: – 20 to +120°C.
ETR 10 a	55	Temperature sensor for surfaces.	PTC resistance sensor.	Temperature range: – 20 to +120°C.
ETS 1.1	52	Temperature sensor for liquids.	NTC resistor. Bronzed brass.	Temperature range: – 25 to +150°C.
ETS 1.2	52	Temperature sensor for liquids.	NTC resistor. Teflon.	Temperature range: – 25 to +150°C.
ETS 2.1	52	Temperature sensor for liquids.	NTC resistor. Bronzed brass.	Temperature range: +100 to +250°C.
ETS 2.2	52	Temperature sensor for liquids.	NTC resistor. Teflon.	Temperature range: +100 to +250°C.
ETS 3	53	Temperature sensor for air.	NTC resistor. Plastic cover.	Temperature range: + 5 to + 60°C.
ETS 6	54	Temperature sensor for liquids.	Semiconductor sensor.	Temperature range: – 20 to +120°C.
ETS 7	54	Temperature sensor for air.	Semiconductor sensor.	Temperature range: – 20 to + 60°C.
ETS 8	54	Temperature sensor for air.	Semiconductor sensor.	Temperature range: – 20 to + 60°C.
ETS 9	54	Temperature sensor for liquids.	Semiconductor sensor.	Temperature range: – 20 to +120°C.
ETS 10	54	Temperature sensor for surfaces.	Semiconductor sensor.	Temperature range: – 20 to +120°C.
FRF 1	61	Front mounting bezel for photosensors, type MGDM.		
FRS 2	64	Front mounting bezel for panel mounting of S-systems.		
HF	65	Hold down spring for additional fixing of S-systems.		
HG 10	57	Gas detector for e.g. methane and butane. (S-system SH 115).		
HG 20	57	Gas detector for toxic gases and smoke. (S-system SH 115).		
ID 120	66	Moving-coil instrument for indication of temperature, revolutions etc. Internal resistance 110Ω.		
ID 270	66	Moving-coil instrument for indication of temperature, revolutions etc. Internal resistance 300Ω.		
IDM 270	66	Moving-coil instrument for indication of temperature, revolutions etc. Internal resistance 300Ω.		
IRE 0.03	32	Photosensor with unmodulated, infrared light. Combined transmitter/receiver.		Range: 30 mm.
ITR 0.2	32	Photosensor with unmodulated, infrared light. Separate transmitter/receiver.		Range: 200 mm.
ITRA 0.2	32	Photosensor with unmodulated, infrared light. Separate transmitter/receiver.		Range: 200 mm.
JD 20	49	DC current metering transformer.	Current range: 2– 20 A. (S-system SJ 125.)	
JD 100	49	DC current metering transformer.	Current range: 10–100 A. (S-system SJ 125.)	
JD 500	49	DC current metering transformer.	Current range: 50–500 A. (S-system SJ 125.)	
JP 05	51	Pressure transducer. Range: 0– 5 psi (0–0.3 bar). Output: 0–20 mA. (S-system SJ 125.)		
JP 15	51	Pressure transducer. Range: 0–15 psi (0–1.0 bar). Output: 0–20 mA. (S-system SJ 125.)		
JP 30	51	Pressure transducer. Range: 0–30 psi (0–2.0 bar). Output: 0–20 mA. (S-system SJ 125.)		
KB 1	62	Ball-and-socket joint mounting bracket for photosensors, type MED, METR, METRM.		
KB 2	62	Ball-and-socket joint mounting bracket for photosensors, type MGDM.		
MATR	33	Photosensors. Separate transmitter/receiver.		Maximum range: 5, 10 og 20 metres.
MBTR	34	Photosensors. Separate transmitter/receiver.		Maximum range: 5, 10 og 20 metres.
MCTR	35	Photosensors. Separate transmitter/receiver.		Maximum range: 2.5, 5 or 10 metres.
MDTR	36	Photosensors. Separate transmitter/receiver.		Maximum range: 2.5, 5 or 10 metres.
MED	37	Photosensor. Combined transmitter/receiver.		Maximum range: 10 metres.
METR	38	Photosensors. Separate transmitter/receiver.		Maximum range: 50 or 100 metres.
METRM	39	Photosensors. Separate transmitter/receiver.	Relay output.	Maximum range: 10 metres.
MFAD	41	Photosensor. Combined transmitter/receiver.		Maximum range: 1 metre.
MFATR	40	Photosensor. Separate transmitter/receiver.		Maximum range: 1 metre.
MFBD	41	Photosensor. Combined transmitter/receiver.	Adjustable.	Maximum range: 1 metre.
MFCD	42	Photosensor. Combined transmitter/receiver.	Adjustable.	Maximum range: 1 metre.
MFD	43	Photosensor. Combined transmitter/receiver.		Maximum range: 1 or 2 metres.
MFTR	44	Photosensor. Separate transmitter/receiver.		Maximum range: 1 or 2 metres.
MGDM 6	45	Photosensor. Combined transmitter/receiver.	Relay output.	Maximum range: 6 metres.
MGDM 6A	46	Photosensor. Combined transmitter/receiver.	Relay output.	Maximum range: 1 metre.
MGDM 6AE	46	Photosensor. Combined transmitter/receiver.	Transistor output.	Maximum range: 1 metre.
MGDM 6E	45	Photosensor. Combined transmitter/receiver.	Transistor output.	Maximum range: 6 metres.

INDEX

TYPE No. — FUNCTION

TYPE No.	PAGE	FUNCTION
MI 5	49	Current transformer. 1-phased AC. Current range: 0.5–5 A. (S-system SM 115, SG 195.)
MI 20	49	Current transformer. 1-phased AC. Current range: 2–20 A. (S-system SM 115, SG 195.)
MI 100	49	Current transformer. 1-phased AC. Current range: 10–100 A. (S-system SM 115, SG 195.)
MI 500	49	Current transformer. 1-phased AC. Current range: 50–500 A. (S-system SM 115, SG 195.)
MI 3050	50	Current transformer. 3-phased AC. Current range: 1–50 A. (S-system SM 190.)
MI 3500	50	Current transformer. 3-phased AC. Current range: 1–500 A. (S-system SM 190.)
MP	50	Current transformer. 3-phased AC. Maximum range: 5 to 500 A. (S-system SM 115.)
OD 02	59	Wind vane for relative wind direction. Control range: $\pm 7^\circ$. (S-system SO 115.)
PK	66	Remote potentiometer kit. (External potentiometer with front plate.)
PL 1	65	Potentiometer lock. For knob-adjustable S-systems.
PPH	60	Cap for head of level probe, type VPP. Polypropylene.
PV 01	58	Anemometer for metering of wind velocity. Range: 2–30 metres/sec. (S-system SP 115.)
S 008	64	8-pole base for printed circuits.
S 011	64	11-pole base for printed circuits.
S 108	64	8-pole base with soldering- and plug connections. For chassis mounting.
S 108 A	64	8-pole base for printed circuits. For chassis mounting.
S 111	64	11-pole base with soldering- and plug connections. For chassis mounting.
S 111 A	64	11-pole base for printed circuits. For chassis mounting.
S 408	64	8-pole base for screw or snap-mounting. Captive cable clamps and cross cut terminal screws.
S 411	64	11-pole base for screw or snap-mounting. Captive cable clamps and cross cut terminal screws.
S 908	64	8-pole base for screw or snap-mounting.
S 911	64	11-pole base for screw or snap-mounting.
SE 010	61	Power supply for photosensors. Supply voltage: 24, 120, or 220 VAC. Output voltage: 3.5 VDC.
SM 13	65	Mounting rack for up to 27 S-systems.
ST 012	66	Transformer for up to 5 S-systems. Primary 220/380 VAC. Secondary: 24 VAC.
ST 024	66	Transformer for up to 10 S-systems. Primary 220/380 VAC. Secondary: 24 VAC.
ST 050	66	Transformer for up to 20 S-systems. Primary 220/380 VAC. Secondary: 24 VAC.
ST 100	66	Transformer for up to 40 S-systems. Primary 220/380 VAC. Secondary: 24 VAC.
VB 2	61	Angle bracket for photosensors, type MGDM.
VH 1	27	Level probe for conductive liquids. Hanging electrode. (S-system SV 110, SV 115, SV 120, SV 125.)
VH 2	27	Level probe for conductive liquids. Hanging electrode. (S-system SV 110, SV 115, SV 120, SV 125.)
VJ 1	29	Level sensor for swimming pools etc. (S-system SV 180, SV 280).
VM	60	Nuts for fixing of level probes, type VN, VPC, VPP, VR, and VT. Thread: 1/2", 1", or 1 1/2".
VN 1	28	Level probe for conductive liquids. Thread: 1 1/2". 1 electrode. Nylon.
VN 2	28	Level probe for conductive liquids. Thread: 1 1/2". 2 electrodes. Nylon.
VN 3	28	Level probe for conductive liquids. Thread: 1 1/2". 3 electrodes. Nylon.
VNY	28	Level probe for conductive liquids. Thread: 1, 2, or 3 electrodes. Removable mounting head.
VNYI	28	As VNY but with polythene coated electrodes.
VP 1 E	30	Optical level sensor with unmodulated IR light. OFF in liquid.
VP 1 EM	31	Optical level sensor with modulated IR light. OFF in liquid.
VP 2 E	30	Optical level sensor with unmodulated IR light. ON in liquid.
VP 2 EM	31	Optical level sensor with modulated IR light. ON in liquid.
VPC 1	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 1 electrode. PVC.
VPC 2	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 2 electrodes. PVC.
VPC 3	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 3 electrodes. PVC.
VPP 1	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 1 electrode. Polypropylene.
VPP 2	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 2 electrodes. Polypropylene.
VPP 3	27	Level probe for conductive liquids. Screw fixing, thread: 1/2" or 1". 3 electrodes. Polypropylene.
VR 1 A	29	Capacitive level sensor. Hanging sensor, nylon. Maximum distance: 4–6 mm.
VR 1 B	29	Capacitive level sensor. Hanging sensor, nylon. Maximum distance: 8–12 mm.
VR 2 A	29	Capacitive level sensor. Screw in sensor, nylon. Maximum distance: 4–6 mm. Thread: 1 1/2".
VR 2 B	29	Capacitive level sensor. Screw in sensor, nylon. Maximum distance: 8–12 mm. Thread: 1 1/2".
VR 3 A	29	Capacitive level sensor. Screw in sensor, teflon. Maximum distance: 4–6 mm. Thread: 1 1/2".
VR 3 B	29	Capacitive level sensor. Screw in sensor, teflon. Maximum distance: 8–12 mm. Thread: 1 1/2".
VRY 2 B	29	Capacitive level sensor. Screw in sensor, polyester. Maximum distance: 8–12 mm. Thread: 1 1/2".
VS 2	28	Level probe in stainless steel for the food industry. 2 teflon-coated electrodes.
VT 1	28	Level probe for conductive liquids. Screw fixing, thread: 1 1/2". Teflon head. 1 electrode.
VT 2	28	Level probe for conductive liquids. Screw fixing, thread: 1 1/2". Teflon head. 2 electrodes.
VT 3	28	Level probe for conductive liquids. Screw fixing, thread: 1 1/2". Teflon head. 3 electrodes.

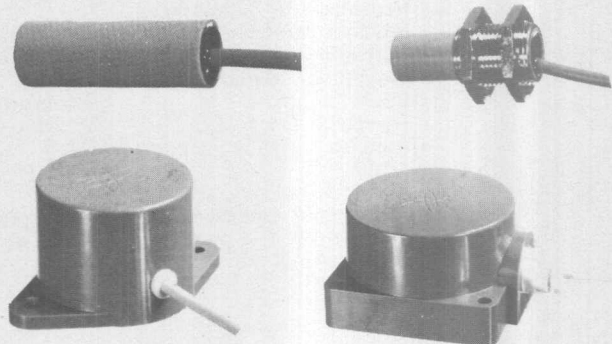
INDUCTIVE SENSORS - NAMUR

I-SHAPED INDUCTIVE SENSORS

The sensor gives a signal when a metallic object approaches the front surface of the sensor.

COMMON TECHNICAL DATA

Supply voltage:	8 VDC/1 K Ω . Supplied by the S-system.
Current	Activated: < 1 mA Not activated: > 3 mA
Ambient temperature:	-20°C to +60°C (-4°F to +140°F).
Proofness:	IP 67
Connection cable:	Moulded, unscreened PVC cable. Can be extended as desired, however resistance: Max. 100 Ω .
Material:	ABS.
Colour:	Blue. DJ 5/DJ 5 G: Light blue.

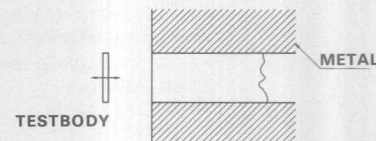
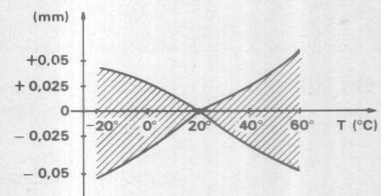


DJ 0.5

Activating distance with Fe: 0.5 mm.
Activating distance with Al: Approx. 0.25 mm.
Testbody: \varnothing 11 x 0.5 mm.
Tolerance on activating distance: $\pm 20\%$
Hysteresis by activating towards front surface: < 0.2 mm.
Activating frequency: Max. 1 KHz.
Mechanical dimensions: See fig. 1 page 13.
Cable length: 0.5 metre, 2 x 0.25 mm², \varnothing 4 mm.
Weight: 10 grams.

This sensor can be embedded in metal as it is activated only at the front surface.
See drawing.

Temperature influence on activating distance

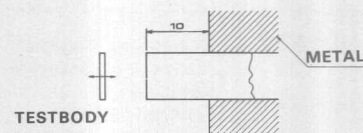
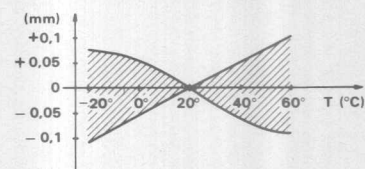


DJ 1

Activating distance with Fe: 1 mm.
Activating distance with Al: Approx. 0.5 mm.
Testbody: \varnothing 11 x 0.5 mm.
Tolerance on activating distance: $\pm 20\%$
Hysteresis by activating towards front surface: < 0.4 mm.
Activating frequency: Max. 1 KHz.
Mechanical dimensions: See fig. 1 page 13.
Cable length: 0.5 metre, 2 x 0.25 mm², \varnothing 4 mm.
Weight: 10 grams.

This sensor cannot be embedded completely in metal as it is sensitive not only at the front surface.
See drawing.

Temperature influence on activating distance

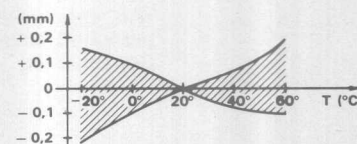


DJ 2/2 G

Activating distance with Fe: 2 mm.
Activating distance with Al: Approx. 1 mm.
Testbody: \varnothing 11 x 0.5 mm.
Tolerance on activating distance: $\pm 10\%$
Hysteresis by activating towards front surface: < 0.4 mm.
Activating frequency: Max. 1 KHz.
Mechanical dimensions: See fig. 1 page 13.
Cable length: 0.5 metre, 2 x 0.25 mm², \varnothing 4 mm.
Thread at DJ 2 G: M 14 x 1.
Weight: DJ 2: 10 grams.
DJ 2 G: 30 grams.

This sensor can be embedded in metal as it is activated only at the front surface.
See drawing.

Temperature influence on activating distance



INDUCTIVE SENSORS - NAMUR

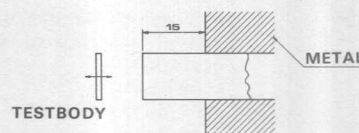
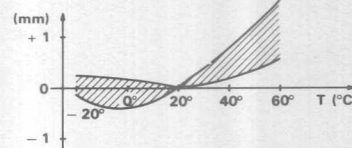
DJ 5/5 G

Activating distance with Fe: 5 mm.
 Activating distance with Al: Approx. 2.5 mm.
 Testbody: $\varnothing 11 \times 0.5$ mm.
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 0.4 mm.
 Activating frequency: Max. 1 KHz.
 Mechanical dimensions: See fig. 1 and 2 next page.
 Cable length: 0.5 metre, $2 \times 0.25 \text{ mm}^2$, $\varnothing 4$ mm.
 Thread at DJ 5 G: M 14 x 1.
 Weight: DJ 5: 10 grams.
 DJ 5 G: 20 grams.



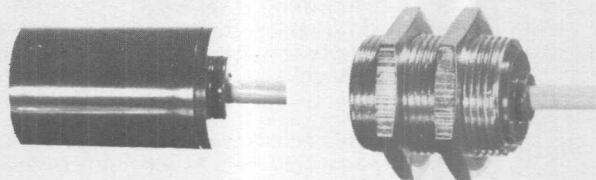
This sensor cannot be embedded completely in metal as it is sensitive not only at the front surface. See drawing.

Temperature influence on activating distance



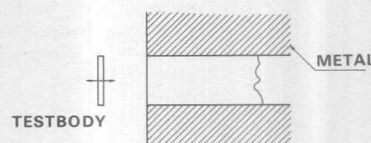
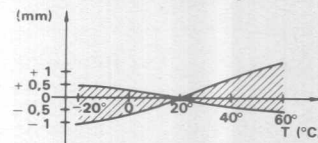
DJ 6/6 G

Activating distance with Fe: 6 mm.
 Activating distance with Al: Approx. 3 mm.
 Testbody: $\varnothing 22 \times 1$ mm.
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 0.4 mm.
 Activating frequency: Max. 1 KHz.
 Mechanical dimensions: See fig. 1 and 3 next page.
 Cable length: 1 metre, $2 \times 0.75 \text{ mm}^2$, \varnothing max. 6.4 mm.
 Thread at DJ 6: PG 21.
 Weight: DJ 6: 50 grams.
 DJ 6 G: 150 grams.



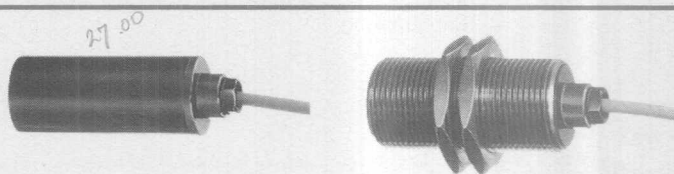
This sensor can be embedded in metal as it is activated only at the front surface. See drawing.

Temperature influence on activating distance



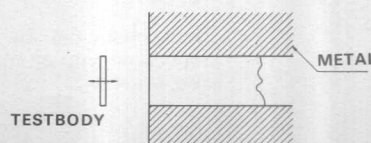
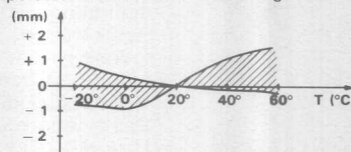
DJ 10/10 G

Activating distance with Fe: 10 mm.
 Activating distance with Al: Approx. 5 mm.
 Testbody: $30 \times 30 \times 1$ mm.
 Tolerance on activating distance: $\pm 20\%$.
 Hysteresis by activating towards front surface: < 0.6 mm.
 Activating frequency: Max. 400 Hz.
 Mechanical dimensions: See fig. 1 and 3 next page.
 Cable length: 1 metre, $2 \times 0.75 \text{ mm}^2$, \varnothing max. 6.4 mm.
 Thread at DJ 10 G: 1 3/8" UNF.
 Weight: DJ 10: 100 grams.
 DJ 10 G: 250 grams.



This sensor can be embedded in metal as it is activated only at the front surface. See drawing.

Temperature influence on activating distance

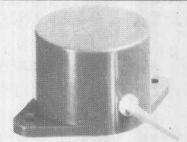


INDUCTIVE SENSORS - NAMUR

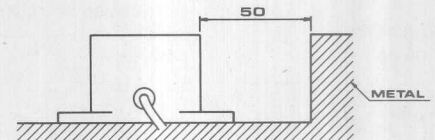
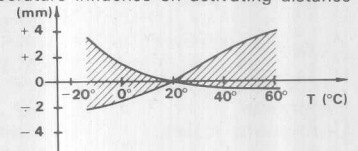
DJ 25

Activating distance with Fe: 25 mm.
 Activating distance with Al: Approx. 13 mm.
 Testbody: Ø 50 x 1 mm.
 Tolerance on activating distance: $\pm 10\%$
 Hysteresis by activating towards front surface: < 1 mm.
 Activating frequency: Max. 250 Hz.
 Mechanical dimensions: See fig. 4 this page.
 Cable length: 1 metre, 2 x 0.25 mm², Ø 4 mm.
 Weight: 150 grams.

This sensor can be activated not only towards the front surface, but also towards the edge.
 The distance from the edge to surrounding metallic parts must therefore be at least 50 mm.
 See drawing.



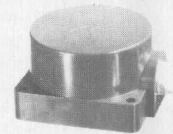
Temperature influence on activating distance



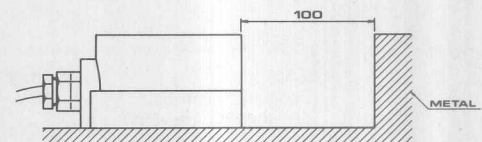
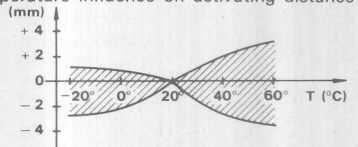
DJ 40

Activating distance with Fe: 40 mm.
 Activating distance with Al: Approx. 20 mm.
 Testbody: Ø 80 x 1 mm.
 Tolerance on activating distance: $\pm 10\%$
 Hysteresis by activating towards front surface: < 5 mm.
 Activating frequency: Max. 100 Hz.
 Mechanical dimensions: See fig. 5 this page.
 Cable length: 1 metre, 2 x 0.75 mm², Ø 5 mm.
 Weight: 500 grams.

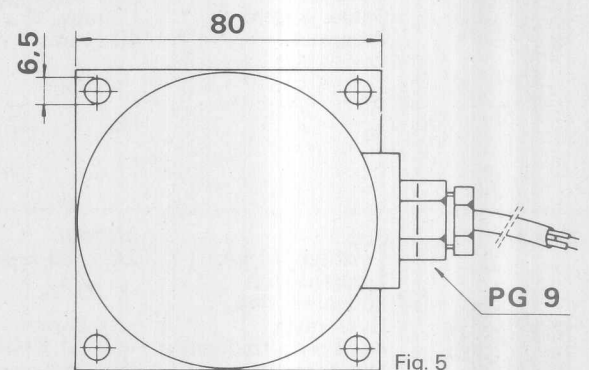
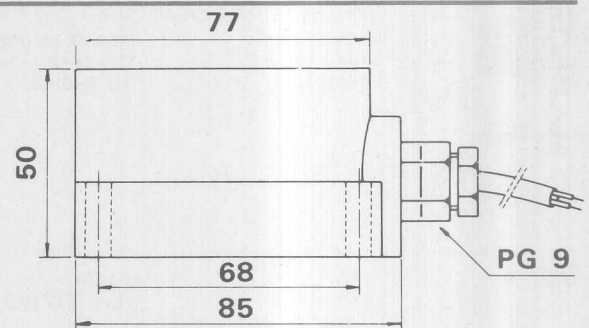
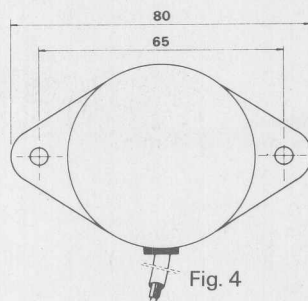
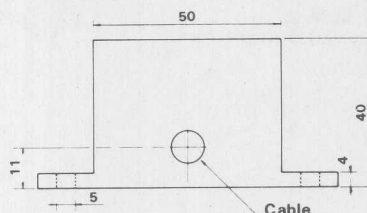
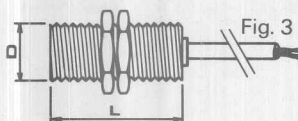
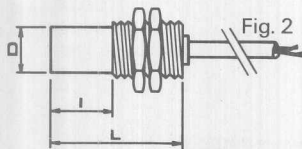
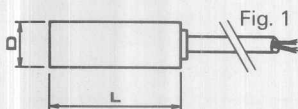
This sensor can be activated not only towards the front surface, but also towards the edge.
 The distance from the edge to surrounding metallic parts must therefore be at least 100 mm.
 See drawing.



Temperature influence on activating distance



MECHANICAL DRAWINGS



Type	Fig.	L	I	D	Thread
DJ 0.5/DJ 1	1	21		6.5	
DJ 2	1	32		11	
DJ 2 G	3	32			M 14 x 1
DJ 5	1	32		11	
DJ 5 G	2	32	15		M 14 x 1
DJ 6	1	35		22	
DJ 6 G	3	35			PG 21
DJ 10	1	89		30	
DJ 10 G	3	89			1 3/8" UNF

INDUCTIVE SENSORS - NAMUR

U-SHAPED INDUCTIVE SENSORS

The sensor gives a signal, when a metallic object is inserted into the air gap.

COMMON TECHNICAL DATA

Supply voltage: 8 VDC/1 K Ω .
 Supplied by the S-system.
 Current Activated: < 1 mA } NAMUR, DIN 19234.
 Not activated: > 3 mA }
 Ambient temperature: -20°C to +60°C (-4°F to +140°F).
 Proofness: IP 67.
 Connection cable: Moulded, unscreened PVC cable.
 Can be extended as desired,
 however resistance: Max. 100 Ω
 Material: ABS.
 Colour: Blue.

Type	U	L	H	B	A	C	D	E
DU 3,5	3,5	19	15	10	7	5	1,9	10
DU 5	5	19	15	10	7	5	1,9	10
DU 6	6	26	30	16	13	2,5	2,2	20
DU 10	10	44	45	25	22	5	4,1	32

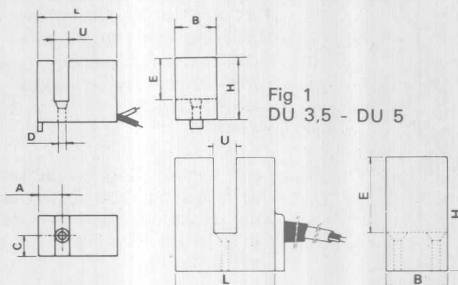
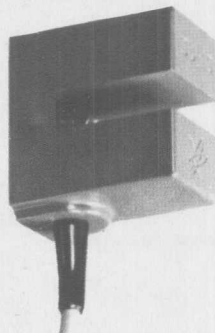
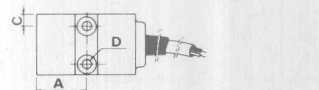


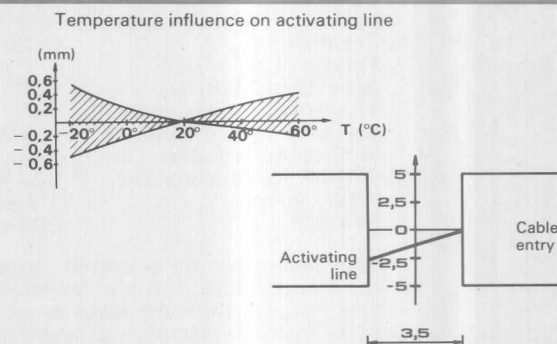
Fig. 2
DU 6 - DU 10



DU 3,5



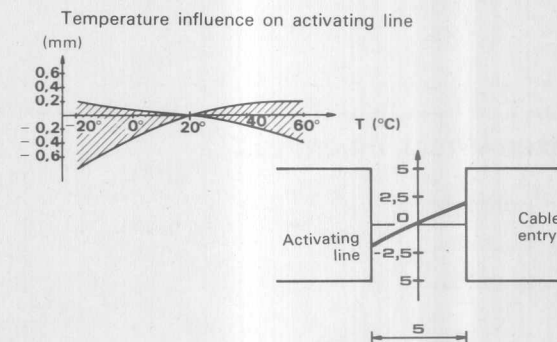
Gap: 3.5 mm.
 Testbody of Fe: 10 x 10 x 0.5 mm.
 Tolerance on activating line: $\pm 20\%$.
 Hysteresis: < 0.3 mm.
 Activation frequency: Max. 2 KHz.
 Dimensions: See drawings above.
 Cable length: 0.5 metre, 2 x 0.10 mm².
 Weight: 10 grams.



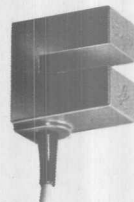
DU 5



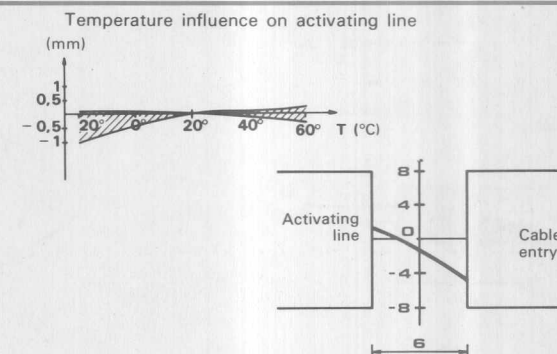
Gap: 5 mm.
 Testbody of Fe: 10 x 10 x 0.5 mm.
 Tolerance on activating line: $\pm 20\%$.
 Hysteresis: < 0.6 mm.
 Activation frequency: Max. 1.5 KHz.
 Dimensions: See drawings above.
 Cable length: 0.5 metre, 2 x 0.10 mm².
 Weight: 10 grams.



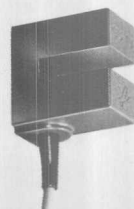
DU 6



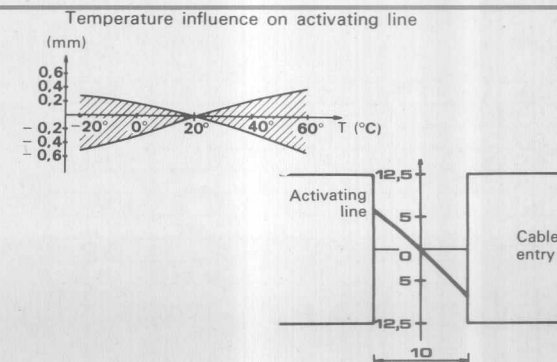
Gap: 6 mm.
 Testbody of Fe: 16 x 16 x 1 mm.
 Tolerance on activating line: $\pm 10\%$.
 Hysteresis: < 0.3 mm.
 Activation frequency: Max. 2 KHz.
 Dimensions: See drawings above.
 Cable length: 1 metre, 2 x 0.25 mm², \varnothing 4 mm.
 Weight: 40 grams.



DU 10



Gap: 10 mm.
 Testbody of Fe: 20 x 20 x 1 mm.
 Tolerance on activating line: $\pm 10\%$.
 Hysteresis: < 0.5 mm.
 Activation frequency: Max. 1 KHz.
 Dimensions: See drawings above.
 Cable length: 1 metre, 2 x 0.25 mm², \varnothing 4 mm.
 Weight: 100 grams.



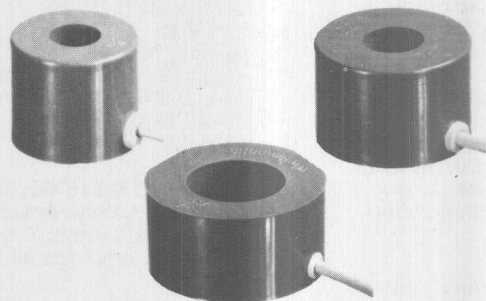
INDUCTIVE SENSORS - NAMUR

O-SHAPED INDUCTIVE SENSORS

The sensor gives a signal when a metallic object passes through the hole.

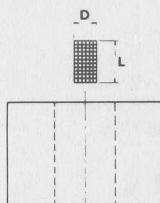
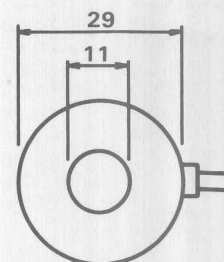
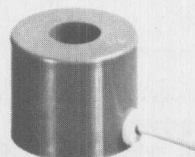
COMMON TECHNICAL DATA

Supply voltage:	8 VDC/1 K Ω . Supplied by the S-system.
Current Activated:	< 1 mA
Not activated:	> 3 mA
Ambient temperature:	- 20°C to + 60°C (- 4°F to + 140°F).
Proofness:	IP 67.
Connection cable:	Moulded, unscreened PVC cable. Standard length: 1 metre, 2 x 0.25 mm ² , \varnothing 4 mm. Can be extended as desired, however resistance: Max. 100 Ω .
Material:	ABS.
Colour:	Blue.



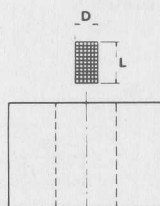
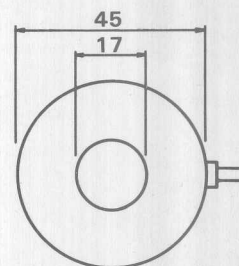
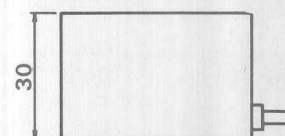
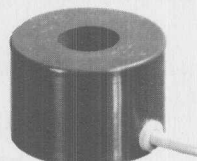
DO 11

Hole diameter:	11 mm.
Min. dimension of the activating Fe-object:	\varnothing 3 x 6 mm (D x L).
Activating line:	Along the centre line of the hole.
Hysteresis by sensing along the centre line:	< 0.3 mm.
Activating frequency:	Max. 2 KHz.
Dimensions:	See drawing.
Weight:	30 grams.



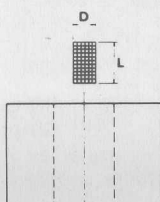
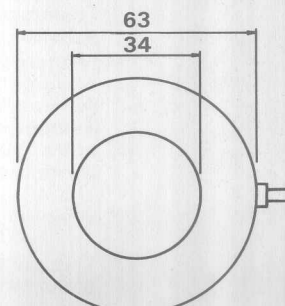
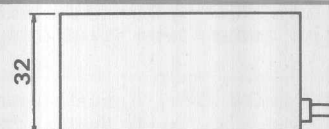
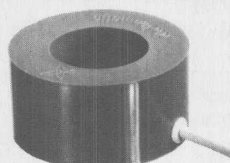
DO 17

Hole diameter:	17 mm.
Min. dimension of the activating Fe-object:	\varnothing 6 x 12 mm (D x L).
Activating line:	Along the centre line of the hole.
Hysteresis by sensing along the centre line:	< 0.3 mm.
Activating frequency:	Max. 1 KHz.
Dimensions:	See drawing.
Weight:	65 grams.



DO 34

Hole diameter:	34 mm.
Min. dimensions of the activating object:	\varnothing 9 x 18 mm (D x L).
Activating line:	Along the centre line of the hole.
Hysteresis by sensing along the centre line:	< 0.3 mm.
Activating frequency:	Max. 1 KHz.
Dimensions:	See drawing.
Weight:	170 grams.



INDUCTIVE SENSORS – WITH AMPLIFIER

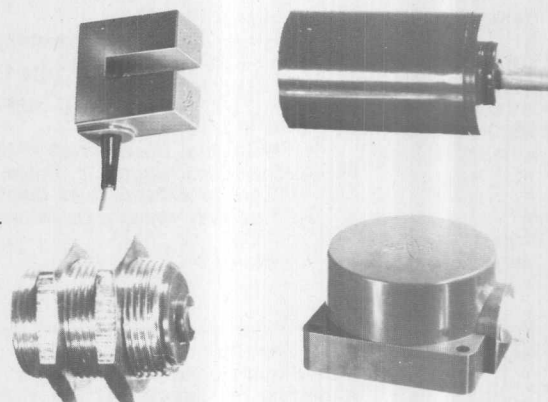
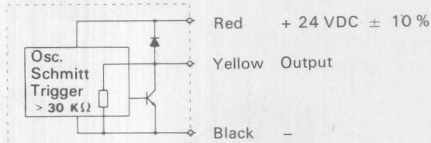
INDUCTIVE SENSORS WITH BUILT-IN AMPLIFIER

3-core models, suitable for controlling S-systems where specified.
See the individual catalogue pages.

COMMON TECHNICAL DATA

Supply voltage: 24 VDC \pm 10%.
Max. ripple on supply voltage: 4 Vpp.
Load current: Max. 200 mA. (open collector-activated – min. 24 VDC – max. 40 VDC).
Leakage current: < 0.8 mA (leakage resistor > 30 k Ω).
Ambient temperature: -20°C to +60°C.
Proofness: IP 67.
Enclosure, material: ABS.
Enclosure, colour: Blue, DJ 5 E/5 GE: Light blue.
Connecting cable: Moulded, unscreened, 3-core PVC cable.
Standard length: 1 metre, 3 \times 0.4 mm², \varnothing 5 mm.
Can be extended as desired.

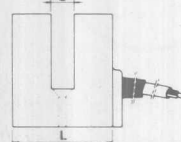
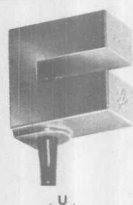
Connecting diagram:



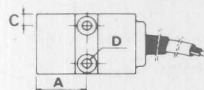
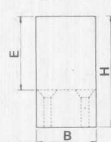
U-SHAPED INDUCTIVE SENSORS

This sensor type gives a signal when a metallic object is inserted into the air gap.

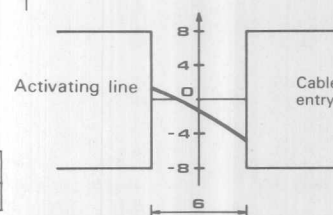
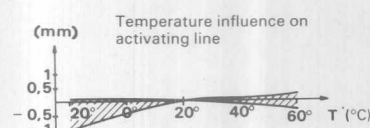
DU 6 E



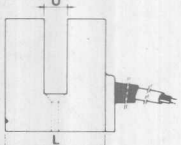
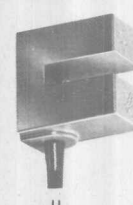
Gap: 6 mm.
Testbody of Fe: 16 x 16 x 1 mm.
Tolerance on activating line: Max. 10 %.
Temperature variation on activating line: \pm 20 %.
Hysteresis: Max. 0.3 mm.
Activating frequency: Max. 2 KHz.
Dimensions: See drawing.
Weight: 40 grams.



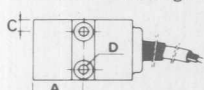
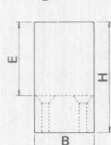
Type	U	L	H	B	A	C	D	E
DU 6 E	6	26	30	16	13	2,5	2,2	20



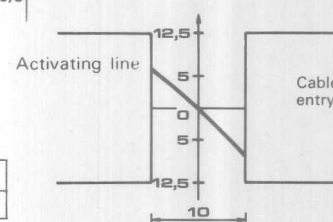
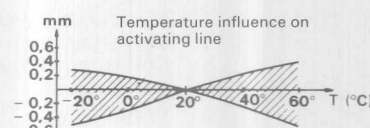
DU 10 E



Gap: 10 mm.
Testbody of Fe: 20 x 20 x 1 mm.
Tolerance on activating line: Max. 10 %.
Temperature variation on activating line: \pm 20 %.
Hysteresis: Max. 0.5 mm.
Activating frequency: Max. 1 KHz.
Dimensions: See drawing.
Weight: 100 grams.



Type	U	L	H	B	A	C	D	E
DU 10 E	10	44	45	25	22	5	4,1	32



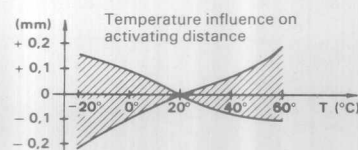
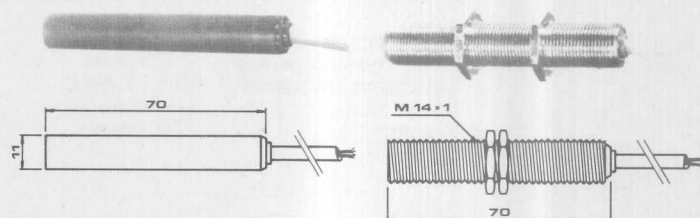
I-SHAPED INDUCTIVE SENSORS

This sensor type gives a signal when a metallic object approaches its front surface.

DJ 2 E/2 GE

Activating distance with Fe: 2 mm.
Activating distance with Al: Approx. 1 mm.
Testbody: \varnothing 11 x 0.5 mm.
Tolerance on activating distance: \pm 10 %.
Hysteresis by activating towards front surface: < 0.4 mm.
Activating frequency: Max. 2 KHz.
Temperature influence on activating distance: \pm 10 %.
Dimensions: See drawings.
Thread at DJ 2 GE: M 14 x 1.
Weight: DJ 2 E: 50 grams.
DJ 2 GE: 65 grams.

This sensor can be embedded in metal as it is activated only on the front surface.
See drawing at DJ 6 E/6 GE.

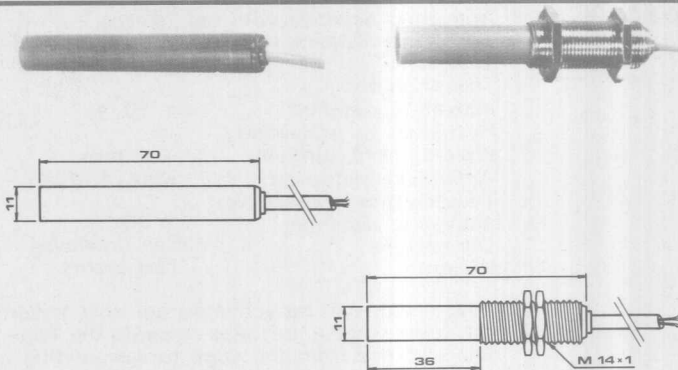


INDUCTIVE SENSORS – WITH AMPLIFIER

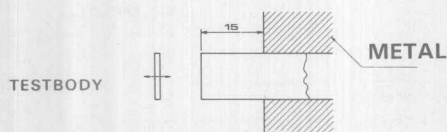
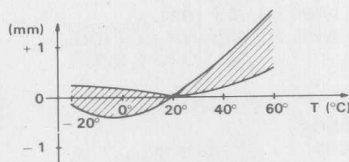
DJ 5 E/5 GE

Activating distance with Fe: 5 mm.
 Activating distance with Al: Approx. 2.5 mm.
 Testbody: $\varnothing 11 \times 0.5$ mm.
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 0.4 mm.
 Activating frequency: Max. 2 KHz.
 Temperature influence on activating distance: $\pm 20\%$.
 Dimensions: See drawings.
 Thread at DJ 5 GE: M 14 x 1.
 Weight: DJ 5 E: 50 grams.
 DJ 5 GE: 60 grams.

This sensor cannot be embedded completely in metal as it is sensitive not only at the front surface.
 See drawing.



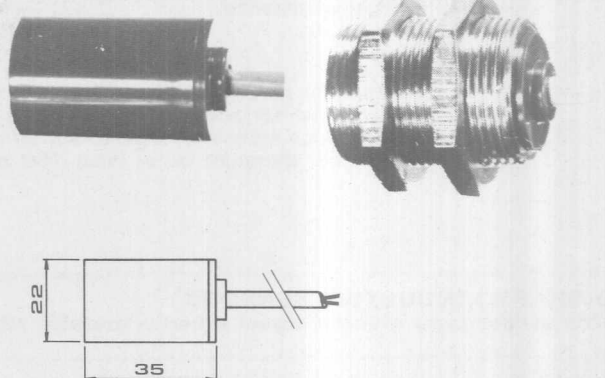
Temperature influence on activating distance



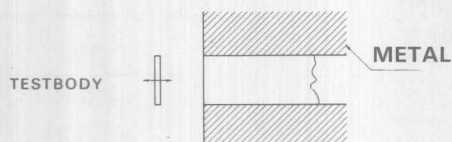
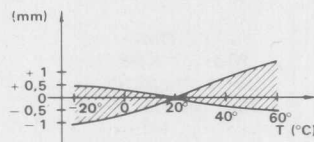
DJ 6 E/6 GE

Activating distance with Fe: 6 mm.
 Activating distance with Al: Approx. 3 mm.
 Testbody: $\varnothing 22 \times 1$ mm.
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 0.4 mm.
 Activating frequency: Max. 1 KHz.
 Temperature influence on activating distance: $\pm 20\%$.
 Dimensions: See drawings.
 Thread at DJ 6 GE: PG 21.
 Weight: DJ 6 E: 50 grams.
 DJ 6 GE: 150 grams.

This sensor can be embedded in metal as it is activated only on the front surface.
 See drawing.



Temperature influence on activating distance

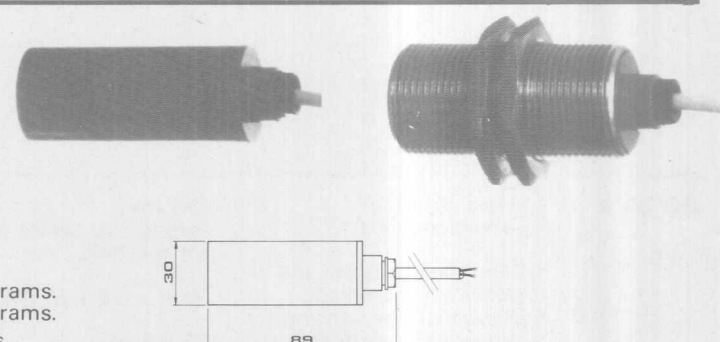


DJ 10 E/10 GE

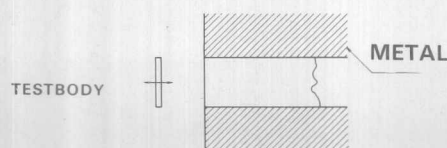
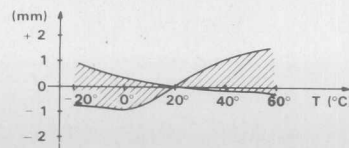
Activating distance with Fe: 10 mm.
 Activating distance with Al: Approx. 5 mm.
 Testbody: 30 x 30 x 1 mm.
 Tolerance on activating distance: $\pm 20\%$.
 Hysteresis by activating towards front surface: < 0.6 mm.
 Activating frequency: Max. 400 Hz.
 Temperature influence on activating distance: $\pm 20\%$.
 Dimensions: See drawings.
 Thread at DJ 10 GE: 1 3/8" UNF.
 Weight: DJ 10 E: 100 grams.
 DJ 10 GE: 250 grams.

This sensor can be embedded in metal as it is activated only on the front surface.
 See drawing.

These sensors are also available with PNP output transistor under the type designations DJ 10 EP/DJ 10 GEP.



Temperature influence on activating distance

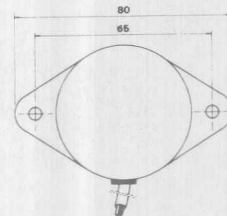
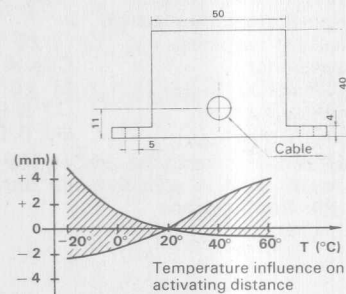
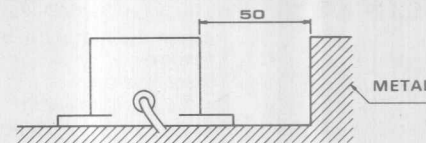
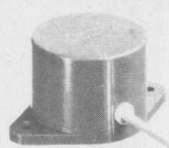


INDUCTIVE SENSORS – WITH AMPLIFIER

DJ 25 E

Activating distance with Fe: 25 mm.
 Activating distance with Al: Approx. 13 mm.
 Testbody:
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 1 mm.
 Activating frequency: Max. 200 Hz.
 Temperature influence on activating distance: $\pm 20\%$.
 Dimensions: See drawings.
 Weight: 150 grams.

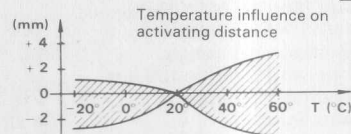
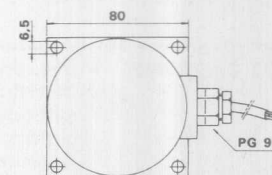
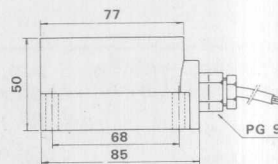
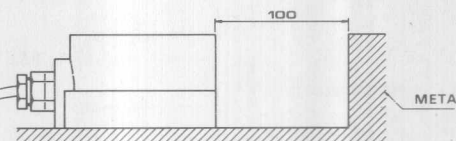
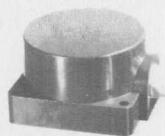
This sensor can be activated not only towards the front surface, but also towards the edge.
 The distance from the edge to surrounding metallic parts must therefore be at least 50 mm. See drawing.



DJ 40 E

Activating distance with Fe: 40 mm.
 Activating distance with Al: Approx. 20 mm.
 Testbody:
 Tolerance on activating distance: $\pm 10\%$.
 Hysteresis by activating towards front surface: < 5 mm.
 Activating frequency: Max. 100 Hz.
 Temperature influence on activating distance: $\pm 20\%$.
 Dimensions: See drawings.
 Weight: 500 grams.

This sensor can be activated not only towards the terminal surface, but also towards the edge.
 The distance from the edge to surrounding metallic parts must therefore be at least 100 mm. See drawing.

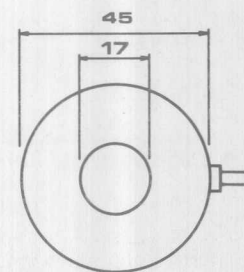
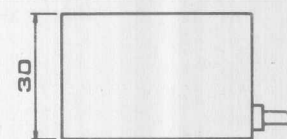
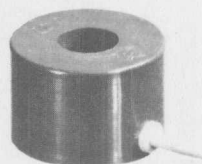
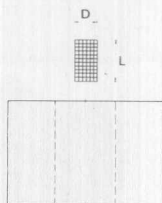


O-SHAPED INDUCTIVE SENSORS

This sensor type gives a signal when a metallic object is passing through its centre hole.

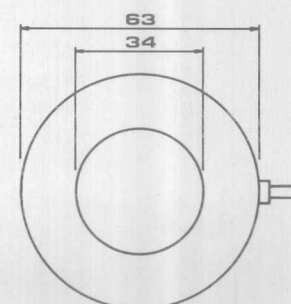
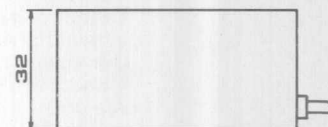
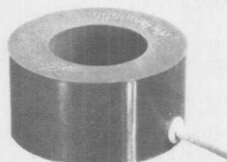
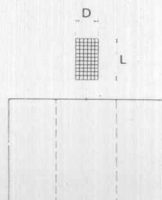
DO 17 E

Hole diameter: 17 mm.
 Activating line: Along the centre line of the hole.
 Min. dimension of the activating Fe-object: $\varnothing 6 \times 12$ mm (D x L).
 Hysteresis by sensing along the centre line: < 0.3 mm.
 Activating frequency: Max. 1 KHz.
 Dimensions: See drawings.
 Weight: 80 grams.

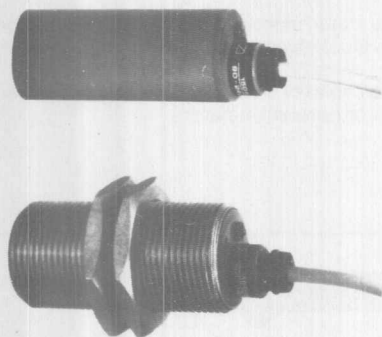


DO 34 E

Hole diameter: 34 mm.
 Activating line: Along the centre line of the hole.
 Min. dimension of the activating Fe-object: $\varnothing 9 \times 18$ mm (D x L).
 Hysteresis by sensing along the centre line: < 0.3 mm.
 Activating frequency: Max. 1 KHz.
 Dimensions: See drawings.
 Weight: 200 grams.



INDUCTIVE SENSORS – AC SUPPLY, 2-CORE



DJ 10 T/DJ 10 GT

- * Inductive proximity sensors.
- * Sensing distance: Maximum 10 mm.
- * Built-in power supply, amplifier, thyristor output, load: 20 - 150 mA.
- * 2-core design. The sensor is connected in series with the load.
- * LED-indication of ON-state (sensor actuated).
- * AC supply voltage: 90-240 VAC, 45-65 Hz.

SPECIFICATIONS

Supply voltage

90-240 VAC,
45-65 Hz.

Output

Thyristor in diode-bridge.
The sensor is connected in series with the load.
See connection diagram and table below.
These inductive sensors are available with inverted function under the type designations DJ 10 T/DJ 10 GTI.

Sensing distance

Maximum 10 mm.

Hysteresis

< 2 mm.

Activating frequency

Maximum 5 Hz.

Nominal load

Minimum: 20 mA.
Maximum: 150 mA.

The stated values refer to the entire voltage range of the sensor.

Short maximum load

1 A for 20 ms at a maximum activating frequency of 1 Hz.

Voltage drop and residual current

The voltage drop over the sensor is less than 11 V, and the power consumption is less than 7 mA when the sensor is not actuated.

LED-indication

A light-emitting diode next to the cable entry indicates when the sensor is ON.

Ambient temperature

-20°C to +70°C.
(-4°F to +158°F).

Connection cable

Moulded, unscreened, grey PVC-cable.
2 metres, 2 x 0.75 mm², 5 mm Ø.
Can be extended if necessary.

Material/colour, house

Thermoplastic polyester, blue.
Type DJ 10 GT with bright, galvanized and passivated steel thread:
1 3/8" - 12 UNF.

Weight

Type DJ 10 T : App. 110 g.
Type DJ 10 GT: App. 300 g.

Accessory

Mounting bracket type DB 1 for fixing of sensor type DJ 10 T.

MODE OF OPERATION

The inductive sensor contains power supply, amplifier, thyristor output and a light-emitting diode for indication of thyristor ON. Nominal load: Minimum: 20 mA, maximum: 150 mA.

An inductive sensor is used to detect metallic media, e.g. iron, aluminium and copper.

The nominal sensing distance - 10 mm - is determined, however, by a 1 x 30 mm Ø grounded steel disc (ST 35) being moved towards the front of the sensor.

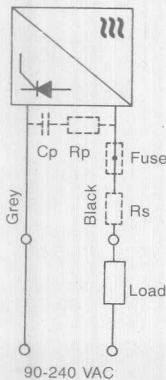
Within the rated values of voltage and temperature a deviation from the nominal sensing distance should be expected, for type DJ 10 T from - 2 mm to + 4 mm, and for type DJ 10 GT from - 3 mm to + 5 mm.

When a metallic medium, being moved towards the front of the sensor, passes a certain point, the sensor delivers an output signal.

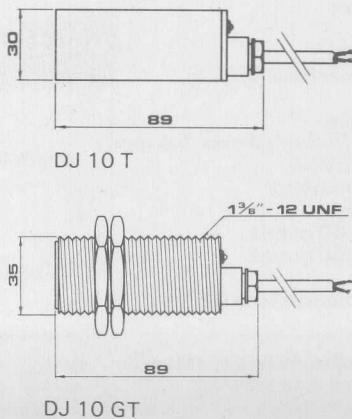
The repeatability of a specific metallic medium is better than 1.0 mm. At detection of metals other than steel, (ST 35), the sensing distance decreases. The hysteresis decreases concurrently with the sensing distance.

INSTALLATION	LOAD TYPE	R _p -C _p	R _s	FUSE
Not protected	Ohmic Small inductive			
Overload protected	Ohmic-lamp		20Ω-5W Wirewound	250 mA I ² t < 0.02 A²s
Transient protected	Inductive	33Ω-0.5W 0.1μF-250V		
Transient + overload protected	Heavy inductive	33Ω-0.5W 0.1μF-250V	20Ω-5W Wirewound	250 mA I ² t < 0.02 A²s

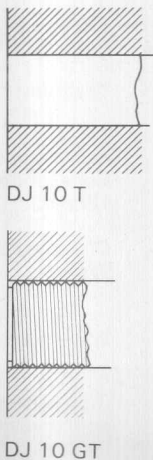
CONNECTION DIAGRAM



DIMENSIONS (mm)



FIXING



CAPACITIVE SENSORS - NAMUR

CAPACITIVE PROXIMITY SENSORS WITHOUT AMPLIFIER

2-core design (NAMUR) suitable for triggering certain S-systems. See the individual catalogue pages.

The digits in the sensor type designation indicate the maximum sensing distance in mm. The testbody which is moved towards the front end of the sensor, is a grounded steel disc with the same diameter as the sensor.

Capacitive proximity sensors are normally used to detect nonmetallic objects being solid or fluid.

The activating distance is determined by the physical and electrical characteristics of the individual objects, and is therefore not generally storable.

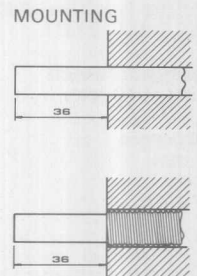
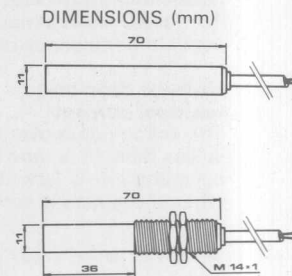
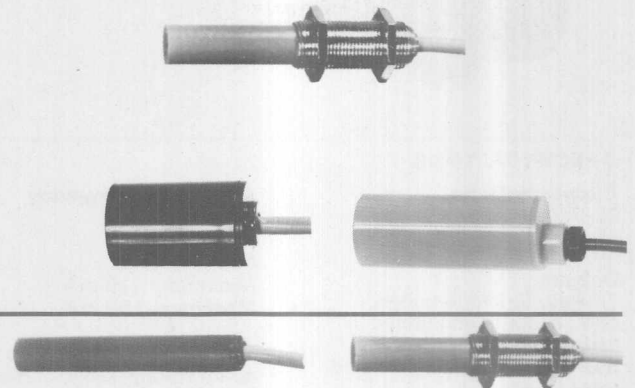
As a rule you may note that solid or fluid conductors are detected at a greater distance than light or porous insulators.

COMMON TECHNICAL DATA

Supply voltage:	7.7 to 9 VDC (normally supplied by the S-system).
Series resistor:	550 to 1100 Ω (1 K Ω in the S-system).
Current - Activated:	< 1 mA
Current - Not activated:	> 3 mA
} NAMUR-sensor, DIN 19234.	
Activating frequency:	Max. 500 Hz.
Ambient temperature:	-20°C to +60°C (-4°F to +140°F).
Proofness:	IP 67.
Connection cable:	Moulded, black, unscreened PVC cable.
Material:	Thermoplastic polyester.
Colour:	Yellow.

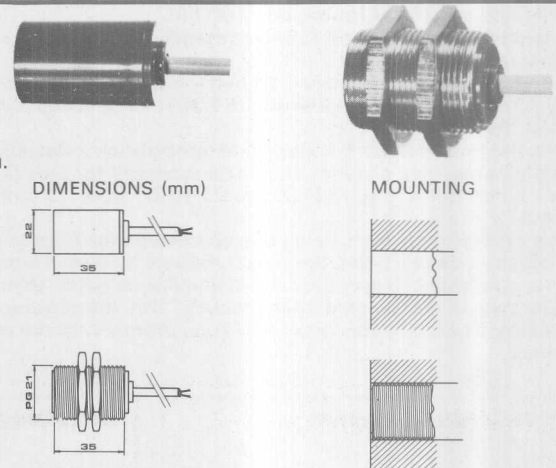
DR 3/DR 3 G	Activating distance:	Max. 3 mm.
	Testbody:	\varnothing 11 x 1 mm grounded steel disc (ST 35).
	Activating frequency:	Max. 500 Hz.
	Connection cable:	1 m, 2 x 0.25 mm ² , \varnothing 4 mm.
	Thread:	M 14 x 1. Black-chromatized.
	Dimensions:	See drawing:
	Weight:	DR 3 : 50 grams. DR 3 G: 60 grams.

This sensor should not be embedded completely, as it is sensitive not only at the front surface. See drawing.



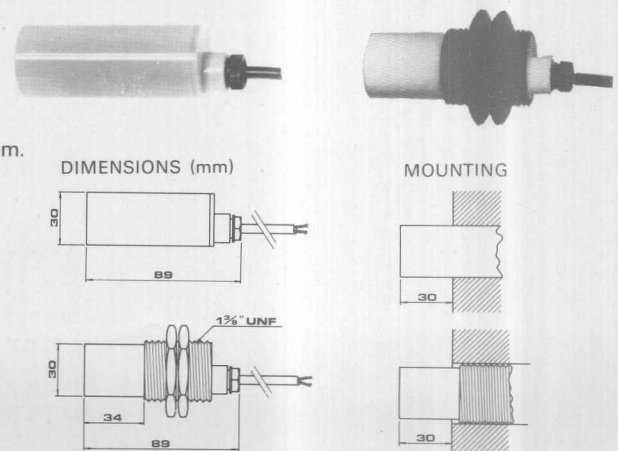
DR 6/DR 6 G	Activating distance:	Max. 6 mm.
	Testbody:	\varnothing 22 x 1 mm grounded steel disc (ST 35).
	Activating frequency:	Max. 500 Hz.
	Connection cable:	1 m, 2 x 0.25 mm ² , \varnothing max. 6.4 mm.
	Thread:	PG 21. Black-chromatized.
	Dimensions:	See drawing.
	Weight:	DR 6 : 50 grams. DR 6 G: 140 grams.

The sensor can be embedded, as it is sensitive only at the front surface. See drawing.



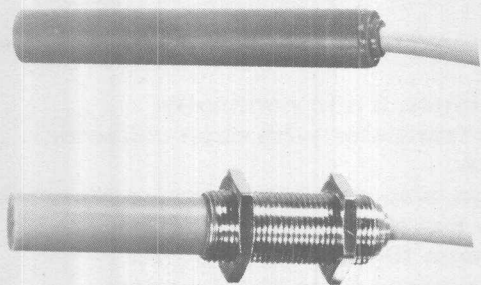
DR 10/DR 10 G	Activating distance:	Max. 10 mm.
	Testbody:	\varnothing 30 x 1 mm grounded steel disc (ST 35).
	Activating frequency:	Max. 500 Hz.
	Connection cable:	1 m, 2 x 0.75 mm ² , \varnothing max. 6.4 mm.
	Thread:	1 3/8" - 12 UNF. Black-chromatized.
	Dimensions:	See drawing.
	Weight:	DR 10 : 100 grams. DR 10 G: 260 grams.
	Accessory:	Mounting bracket type DB 1.

This sensor should not be embedded completely, as it is sensitive not only at the front surface. See drawing.



CAPACITIVE SENSORS – WITH AMPLIFIER

DR 3 E/DR 3 GE



- * Capacitive sensors for solid, fluid or granulated substances.
- * Sensing distance: 3 mm nominally.
- * NPN output-transistor with open collector, max. 200 mA.
- * 3-core design, also suitable in conjunction with some of the S-systems.
- * Supply voltage: 10-27 VDC.
Normally delivered from the S-system.

SPECIFICATIONS

Supply voltage
10-27 VDC.
Maximum ripple: 4 Vpp.
The supply voltage is normally delivered from the S-system.

Output
Diode-protected NPN output-transistor. Yellow core is short-circuited to negative, when the sensor is actuated.

Load
Max. load: 200 mA.
The stated load refers to the entire voltage range of the sensor.

Current consumption
Approximately 12 mA.

Sensing distance
Maximum 3 mm.

Hysteresis
Less than 0.6 mm.

Activating frequency
Maximum 500 Hz.
In conjunction with S-systems, max. 10 Hz.

Ambient temperature
- 20°C to + 60°C.
(- 4°F to + 140°F).

Proofness
IP 67.

Connection cable
Moulded, unscreened, black PVC-cable.
1 metre, 3 x 0.40 mm², 4.5 mm Ø.
Can be extended if necessary, maximum resistance however: 100 Ω.

Material/colour, house
Thermoplastic polyester, yellow.
Type DR 3 GE with black, chromatised steel thread: M 14 x 1.

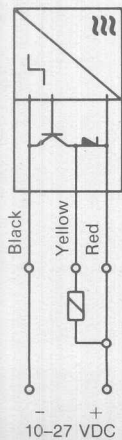
Weight
Type DR 3 E: App. 50 g.
Type DR 3 GE: App. 60 g.

MODE OF OPERATION

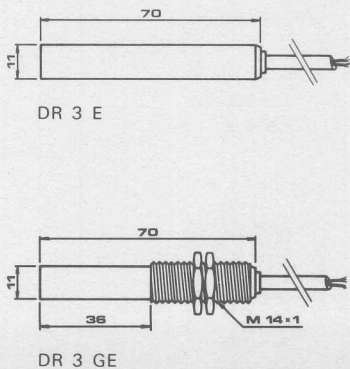
Can be used in conjunction with some of the S-systems.
The sensor contains a NPN output-transistor with open collector, max. 200 mA.
A capacitive sensor detects any solid, fluid or granulated substance being conductive or non-conductive.
The nominal sensing distance – 3 mm – is determined by a 1 x 11 mm Ø grounded steel disc. (ST 35) being moved towards the front end of the sensor.

When a medium being moved towards the front of the sensor passes a certain point, the sensor delivers an output signal.
As the maximum sensing distance depends on the physical and electrical characteristics of the medium to be detected, it is not possible to state this value generally. However, you may note, that conductors, solid or fluid, are detected at a greater distance than light or porous insulators.
The repeatability is, irrespective of the nature of the detected medium, better than 0.3 mm.
If the sensing distance is decreased, the hysteresis decreases too.

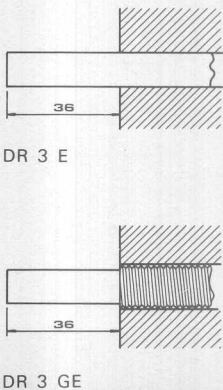
CONNECTION DIAGRAM



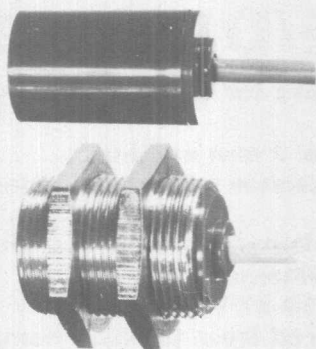
DIMENSIONS (mm)



FIXING



CAPACITIVE SENSORS – WITH AMPLIFIER



DR 6 E/DR 6 GE

- * Capacitive sensors for solid, fluid or granulated substances.
- * Sensing distance: 6 mm nominally.
- * NPN output-transistor with open collector, max. 200 mA.
- * 3-core design, also suitable in conjunction with some of the S-systems.
- * Supply voltage: 10-27 VDC.
Normally delivered from the S-system.

SPECIFICATIONS

Supply voltage
10-27 VDC.
Maximum ripple: 4 Vpp.
The supply voltage is normally delivered from the S-system.

Output
Diode-protected NPN output-transistor. Yellow core is short-circuited to negative, when the sensor is actuated.

Load
Max. load: 200 mA.
The stated load refers to the entire voltage range of the sensor.

Current consumption
Approximately 12 mA.

Sensing distance
Maximum 6 mm.

Hysteresis
Less than 1.2 mm.

Activating frequency
Maximum 500 Hz.
In conjunction with S-systems, max. 10 Hz.

Ambient temperature
-20°C to +60°C
(-4°F to +140°F).

Proofness
IP 67.

Connection cable
Moulded, unscreened, black PVC-cable.
1 metre, 3 x 0.40 mm², 4.5 mm Ø.
Can be extended if necessary, maximum resistance however: 100 Ω.

Material/colour, house
Thermoplastic polyester, yellow.
Type DR 6 GE with black, chromatised steel thread: PG 21.

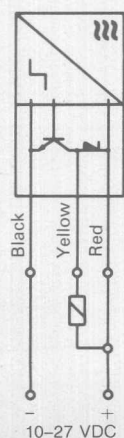
Weight
Type DR 6 E : App. 50 g.
Type DR 6 GE: App. 150 g.

MODE OF OPERATION

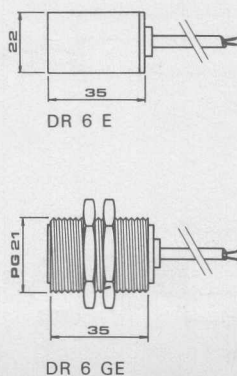
Can be used in conjunction with some of the S-systems.
The sensor contains a NPN output-transistor with open collector, max. 200 mA.
A capacitive sensor detects any solid, fluid or granulated substance being conductive or non-conductive.
The nominal sensing distance – 6 mm – is determined by a 1 x 22 mm Ø grounded steel disc (ST 35) being moved towards the front end of the sensor.

When a medium being moved towards the front of the sensor passes a certain point, the sensor delivers an output signal.
As the maximum sensing distance depends on the physical and electrical characteristics of the medium to be detected, it is not possible to state this value generally. However, you may note, that conductors, solid or fluid, are detected at a greater distance than light or porous insulators.
The repeatability is, irrespective of the nature of the detected medium, better than 0,6 mm.
If the sensing distance is decreased, the hysteresis decreases too.

CONNECTION DIAGRAM



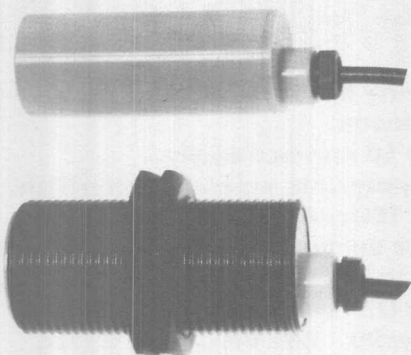
DIMENSIONS (mm)



FIXING



CAPACITIVE SENSORS – WITH AMPLIFIER



DR 10 E/DR 10 GE

- * Capacitive sensors for solid, fluid or granulated substances.
- * Sensing distance: 10 mm nominally.
- * NPN output-transistor with open collector, max. 200 mA.
- * 3-core design, also suitable in conjunction with some of the S-systems.
- * Supply voltage: 10-27 VDC.
Normally delivered from the S-system.

SPECIFICATIONS

Supply voltage

10-27 VDC.
Maximum ripple: 4 Vpp.

Output

Diode-protected NPN output-transistor. Yellow core is short-circuited to negative, when the sensor is actuated. Also available with PNP output-transistor under the type designations DR 10 EP/DR 10 GEP.
With NPN output and inverted function: DR 10 EI/DR 10 GEI.

Load

Max. load: 200 mA.
The stated load refers to the entire voltage range of the sensor.

Current consumption

Approximately 12 mA.

Sensing distance

Maximum 10 mm.

Hysteresis

Less than 2 mm.

Activating frequency

Maximum 500 Hz.
In conjunction with S-system, max. 10 Hz.

Ambient temperature

-20°C to +60°C
(-4°F to +140°F).

Proofness

IP 67.

Connection cable

Moulded, unscreened, black PVC-cable.
1 metre, 3 x 0.40 mm², 4.5 mm Ø.
Can be extended if necessary, maximum resistance however: 100 Ω.

Material/colour, house

Thermoplastic polyester, yellow.
Type DR 10 GE with black, chromatised steel thread: 1 3/8" - 12 UNF.

Weight

Type DR 10 E : App. 110 g.
Type DR 10 GE: App. 300 g.

Accessory

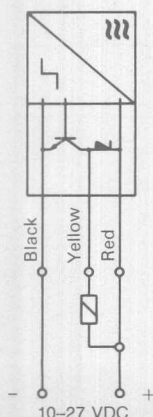
Mounting bracket type DB 1 for fixing of sensor type DR 10 E.

MODE OF OPERATION

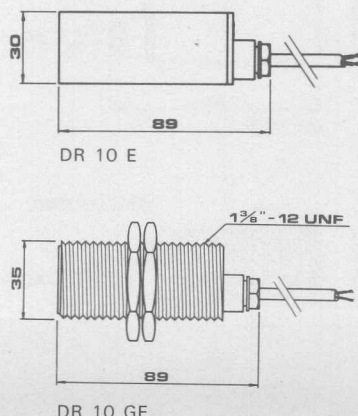
Can be used in conjunction with some of the S-systems.
The sensor contains a NPN output-transistor with open collector, max. 200 mA.
A capacitive sensor detects any solid, fluid or granulated substance being conductive or non-conductive.
The nominal sensing distance - 10 mm is determined by a 1 x 30 mm Ø grounded steel disc (ST 35) being moved towards the front end of the sensor.
Within the rated values of voltage and temperature a deviation from -2 to +4 mm from the nominal sensing distance should be expected.

When a medium being moved towards the front of the sensor passes a certain point, the sensor delivers an output signal. As the maximum sensing distance depends on the physical and electrical characteristics of the medium to be detected, it is not possible to state this value generally. As a rule you may note that solid or fluid conductors are detected at a greater distance than light or porous insulators.
The repeatability of a specific medium is better than 1 mm.
At decreasing sensing distance, the hysteresis decreases concurrently.

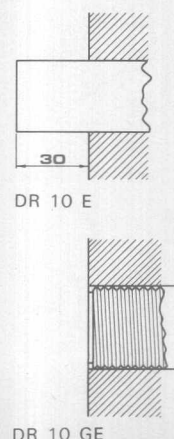
CONNECTION DIAGRAM



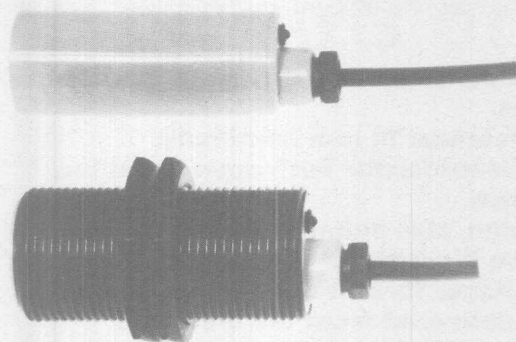
DIMENSIONS (mm)



FIXING



CAPACITIVE SENSORS – AC SUPPLY, 2-CORE



DR 10 T/DR 10 GT

- * Capacitive proximity sensors for solid, fluid or granulated substances.
- * Sensing distance: 10 mm nominally.
- * Built-in power supply unit, amplifier, thyristor output, load: 20 - 150 mA.
- * 2-core design. The sensor is connected in series with the load.
- * LED-indication of ON-state (sensor actuated).
- * AC supply voltage: 90 - 240 VAC, 45 - 65 Hz.

SPECIFICATIONS

Supply voltage

90-240 VAC.
45-65 Hz

Output

Thyristor in diode-bridge.
The sensor is connected in series with the load.
See connection diagram and table below.
These sensors are also available with inverted function under the type designations DR 10 T/DR 10 GTI.

Sensing distance

Maximum 10 mm.

Hysteresis

< 2 mm.

Activating frequency

Maximum 5 Hz.

Nominal load

Minimum: 20 mA - maximum: 150 mA.
The stated values refer to the entire voltage range of the sensor.

Short max. load

1 A for 20 ms at a maximum activating frequency of 1 Hz.

Voltage drop and residual current

The voltage drop over the sensor is less than 11 V, and the current consumption is less than 7 mA, when the sensor is not actuated.

LED-indication

A light-emitting diode next to the cable entry indicates when the sensor is ON.

Ambient temperature

Type DR 10 T:
- 20°C to + 70°C
(- 4°F to + 158°F).

Type DR 10 GT:
- 10°C to + 70°C
(+ 14°F to + 158°F).

Connection cable

Moulded, unscreened, black PVC-cable.
1 metre, 2 x 0.75 mm², 5.0 mm Ø.
Can be extended if necessary.

Material/colour, house

Thermoplastic polyester, yellow.
Type DR 10 GT with black chromatised steel thread: 1 3/8" - 12 UNF.

Weight

Type DR 10 T : App. 110 g.
Type DR 10 GT: App. 300 g.

Accessory

Mounting bracket type DB 1 for fixing of sensor type DR 10 T.

MODE OF OPERATION

The sensor contains power supply unit, amplifier and thyristor output with load: Min. 20 - Max. 150 mA.

A capacitive sensor is normally used to detect non-metallic media, as it detects any solid, fluid, or granulated substances being conductive or non-conductive, contrary to inductive sensors. The nominal sensing distance - 10 mm - is determined, however, by a 1 x 30 mm Ø grounded steel disc (ST 35) being moved towards the front end of the sensor.

Within the rated values of voltage and temperature a deviation from the nominal sensing distance must be expected, for type DR 10 T from - 2 to + 4 mm, and for type DR 10 GT from - 3 to + 5 mm.

When a medium being moved towards the front of the sensor passes a certain point, the sensor delivers an output signal.

As the maximum sensing distance depends on the physical and electrical characteristics of the medium to be detected, it is not possible to state this value generally. As a rule you may note

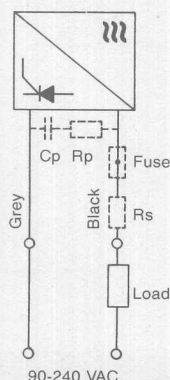
that solid or fluid conductors are detected at a greater distance than light or porous insulators.

The repeatability of a specific medium is better than 1 mm.

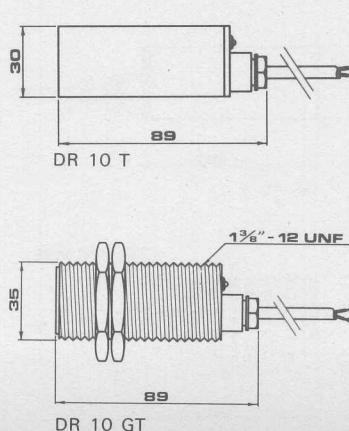
At decreasing sensing distance, the hysteresis decreases concurrently.

INSTALLATION	LOAD TYPE	R _p -C _p	R _s	FUSE
Not protected	Ohmic Small inductive			
Overload protected	Ohmic-lamp		20Ω-5W Wirewound	250 mA I ² t < 0.02 A ² s
Transient protected	Inductive	33Ω-0.5W 0.1μF-250V		
Transient + overload protected	Heavy inductive	33Ω-0.5W 0.1μF-250V	20Ω-5W Wirewound	250 mA I ² t < 0.02 A ² s

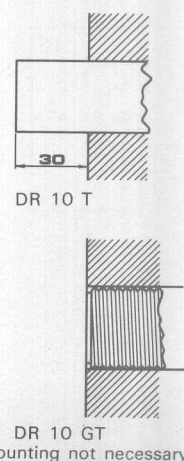
CONNECTION DIAGRAM



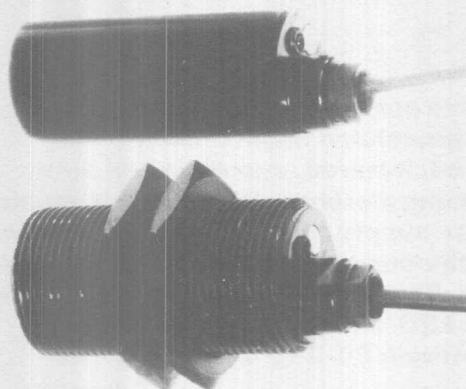
DIMENSIONS (mm)



FIXING



OPTICAL SENSORS – WITH AMPLIFIER



DP 10 E/DP 10 GE

- * Retro-reflective, optical proximity sensors for solid, fluid or granulated substances.
 - * Adjustable sensing distance: Max. 150 mm.
 - * Built-in power supply unit, amplifier, transmitter/receiver, NPN output-transistor with open collector, max. 200 mA.
 - * 3-core design, also applicable with S-systems.
 - * LED-indication of ON-state (sensor actuated).
 - * Supply voltage: 10–27 VDC.
- Normally delivered from the S-system.

SPECIFICATIONS

Supply voltage

10–27 VDC.
Maximum ripple: 4 Vpp.
The supply voltage is normally delivered from the S-system.

Output

Diode-protected NPN output-transistor.
Yellow core is short-circuited to negative, when the sensor is actuated.

Load

Max. load 200 mA.
The stated value refers to the entire voltage range of the sensor.

Current consumption

Approximately 20 mA.

Sensing distance

Maximum 150 mm.
Adjustment on built-in potentiometer possible with a screwdriver.

Activating frequency

Maximum 100 Hz.
In conjunction with S-systems, max. 10 Hz.

Ambient temperature

– 20°C to + 60°C.
(– 4°F to + 140°F).

Wavelength of the light

940 nm (9400 Å).

Modulation frequency

8 KHz.

Material/colour, house

Polycarbonate, black.
Type DP 10 GE with black, chromatised steel thread: 1 3/8" – 12 UNF.

Proofness

IP 62.

Connection cable

Moulded, unscreened, black PVC-cable.
1 metre, 3 x 0.40 mm², 4.5 mm Ø.
Can be extended if necessary, maximum resistance however: 100 Ω.

Weight

Type DP 10 E: App. 110 g.
Type DP 10 GE: App. 300 g.

Accessory

Mounting bracket type DB 1 for fixing of sensor type DP 10 E.

MODE OF OPERATION

These retro-reflective optical sensors can be used in conjunction with some of the S-systems.

The sensors contain power supply unit, amplifier, NPN output-transistor, trimming potentiometer, and a light-emitting diode for indication of transistor ON.

The light source is a Ga-As diode emitting modulated, infrared light in short pulses. A phototransistor senses when the emitted light is reflected from a medium in front of the photosensor. Together with the modulation and the synchronization of the light, a band-pass filter make the photosensors insensitive to ambient light sources.

As the maximum sensing distance of the sensor is determined by form, colour and character of the surface of the reflecting medium, it is not possible to state this value generally.

See table of »SENSING DISTANCES«.

The range is adjustable up to the maximum sensing distance. This makes it possible to exclude detection of the background of the object.

Neither should the sensor be used in liquids likely to fasten to the house, nor should liquid come into contact with the rear of the sensor (at the cable entry), because of the built-in trimming potentiometer.

SENSING DISTANCES

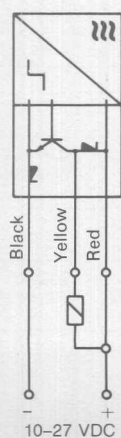
Surface of object	Minimum potentiometer setting	Maximum potentiometer setting
Dead white	10–30 mm	1–150 mm
Dead black	Cannot be detected	5– 25 mm

Other models available:

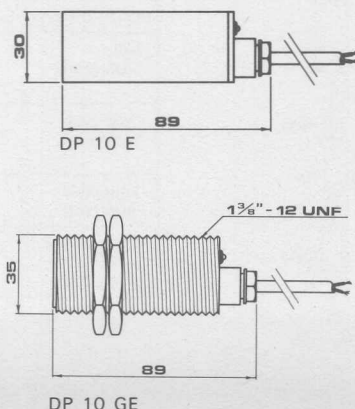
DP 10 EI/DP 10 GEI with inverted function.

DP 10 EP/DP 10 GEP with PNP output transistor.

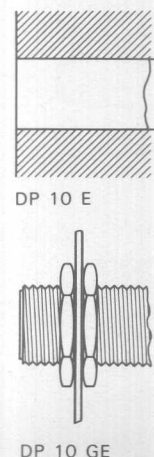
CONNECTION DIAGRAM



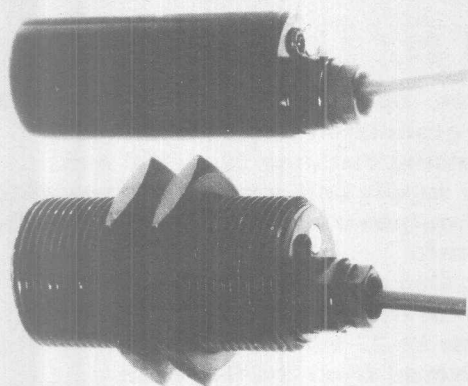
DIMENSIONS (mm)



FIXING



OPTICAL SENSORS – AC SUPPLY, 2-CORE



DP 10 T/DP 10 GT

- * **Retro-reflective optical proximity sensors for solid, fluid or granulated substances.**
- * **With modulated, infrared, synchronized light.**
- * **Maximum sensing distance: 150 mm, adjustable.**
- * **Built-in power supply unit, amplifier, transmitter/receiver, thyristor output, load: 20 – 150 mA.**
- * **2-core design. The sensor is connected in series with the load. LED-indication of ON-state.**
- * **AC supply voltage: 60–265 VAC, 45–65 Hz.**

SPECIFICATIONS

Supply voltage
90–240 VAC,
45–65 Hz.

Sensing distance
Maximum 150 mm.
Adjustment on built-in potentiometer possible with a screwdriver. See table below.

Activating frequency
Maximum 5 Hz.

Output
Thyristor in diode-bridge. The sensor is connected in series with the load.
See connection diagram and table below.

These optical sensors are also available with inverted function under the type designations DP 10 TI/DP 10 GTI.

Nominal load
Minimum: 20 mA.
Maximum: 150 mA.
The stated values refer to the entire voltage range of the sensor.

Short maximum load
1 A for 20 ms at a maximum activating frequency of 1 Hz.

Voltage drop and residual current
The voltage drop over the sensor is less than 11 V, and the power consumption is less than 7 mA when the sensor is not actuated.

LED-indication
A light-emitting diode next to the cable entry indicates, when the sensor is actuated.

Ambient temperature
– 20°C to + 60°C.
(– 4°F to + 140°F).

Light
Wavelength: 940 nm.
Modulation frequency: 8 KHz.

Connection cable
Moulded, unscreened, black PVC-cable.
2 metres, 2 × 0.75 mm²,
Can be extended if necessary.

Proofness
IP 62.

Material/colour, house
Polycarbonate, black.
Type DP 10 GT with black chromatised steel thread: 1 3/8" – 12 UNF.

Weight
Type DP 10 T : App. 110 g.
Type DP 10 GT: App. 300 g.

Accessory
Mounting bracket type DB 1 for fixing of sensor type DP 10 T.

MODE OF OPERATION

These retro-reflective optical sensors can detect solid, fluid, and granulated media.
The sensors contain power supply unit, amplifier, thyristor output, trimming potentiometer, and a light-emitting diode for indication of thyristor ON.
The light source is a Ga-As diode emitting modulated, infrared light in short pulses. A phototransistor senses, when the emitted light is reflected from a medium in front of the optical sensor. Together with the modulation and the synchronization of the light a band-pass filter make the sensors insensitive to ambient light sources.
As the maximum sensing distance of the sensor is determined by form, colour and character of the surface of the reflecting medium, it is not possible to state this value generally.
See table of »SENSING DISTANCES«.

The sensing distance can be adjusted by the built-in potentiometer. This makes it possible to exclude detection of the background of the object.

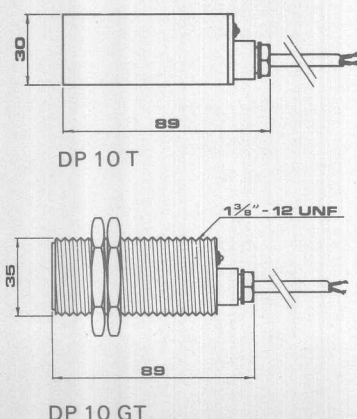
Neither should the sensor be used in liquids likely to fasten to the house, nor should liquid come into contact with the rear of the sensor (at the cable entry), because of the trimming potentiometer.

SENSING DISTANCES

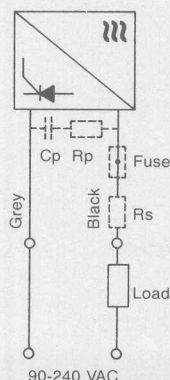
Surface of object	Minimum potentiometer setting	Maximum potentiometer setting
Dead white	10–30 mm	1–150 mm
Dead black	Cannot be detected	5– 25 mm

Other models available:
DP 10 TI/DP 10 GTI with inverted function.

DIMENSIONS (mm)



CONNECTION DIAGRAM



INSTALLATION	LOAD TYPE	R _p -C _p	R _s	FUSE
Not protected	Ohmic Small inductive			
Overload protected	Ohmic-lamp		20Ω-5W Wirewound	250 mA I ² t < 0.02 A ² s
Transient protected	Inductive	33Ω-0.5W 0.1μF-250V		
Transient + overload protected	Heavy inductive	33Ω-0.5W 0.1μF-250V	20Ω-5W Wirewound	250 mA I ² t < 0.02 A ² s

LEVEL PROBES

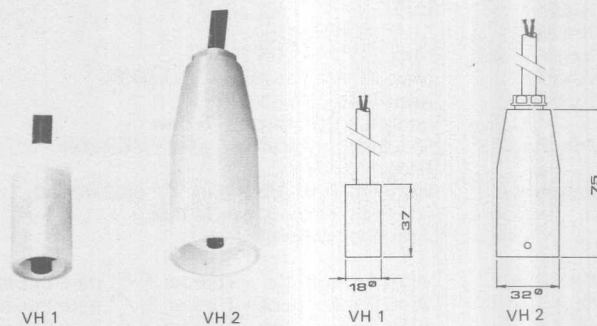
LEVEL PROBES FOR CONDUCTIVE LIQUIDS

For use in conjunction with level control SV 110/SV 115/SV 120/SV 125

LEVEL PROBES TYPE VH

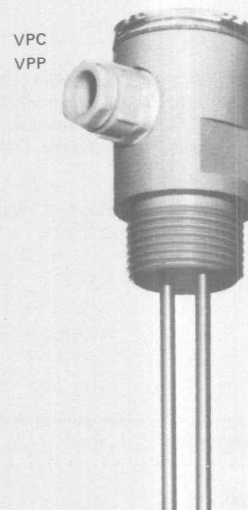
- VH 1 Hanging electrode with 5 metres Neopren cable.
 VH 2 Insulated electrode with 5 metres Neopren cable.

Insulation: Nylon 6.
 Electrode: Stainless steel.



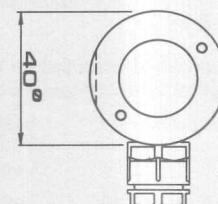
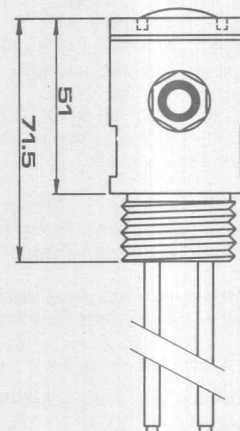
LEVEL PROBES TYPE VPC

- Screw fixing.
 Material: PVC.
 Colour: Red.
 Cover for probe head: Transparent cover of Polymethacrylat.
 Thread: $\frac{1}{2}$ " pipe thread (Type VPC x-0,5)
 $1\frac{1}{2}$ " pipe thread (Type VPC x-1,0).
 Temperature: Max. 70°C (+ 158°F).
 Pressure: Max. 10 atm. at + 60°C (+ 140°F).
 Electrodes: Material: Stainless 24.
 Insulation: PVC-coated.
 Length: 500 mm - Ø 4 mm.
 Mounting: The probe includes a cable entry PG 9 (Ø 5 to 9 mm cable), and nipples for mounting of cable which is not included.
 Accessories: Nuts type VM 0,5 with $\frac{1}{2}$ " pipe thread and type VM 1,0 with $1\frac{1}{2}$ " pipe thread.
 For fixing of the probe in thin container walls etc.
 VPC 1-0,5: With 1 electrode - Thread: $\frac{1}{2}$ " pipe thread.
 VPC 2-0,5: With 2 electrodes - Thread: $\frac{1}{2}$ " pipe thread.
 VPC 1-1,0: With 1 electrode - Thread: $1\frac{1}{2}$ " pipe thread.
 VPC 2-1,0: With 2 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.
 VPC 3-1,0: With 3 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.



LEVEL PROBES TYPE VPP

- Screw fixing.
 Material: Polypropylen.
 Colour: Grey.
 Cover for probe head: Transparent cover of Polymethacrylat.
 The sensor can be delivered with a grey cover type PPH made of Polypropylen.
 Thread: $\frac{1}{2}$ " pipe thread (Type VPP x-0,5)
 $1\frac{1}{2}$ " pipe thread (Type VPP x-1,0).
 Temperature: Max. 100°C. (+ 212°F).
 Pressure: Max. 10 atm. at + 60°C (+ 140°F).
 Electrodes: Material: Stainless 24.
 Insulation: Kynar (PVDF) -coated.
 Length: 500 mm - Ø 4 mm.
 Mounting: The probe includes a cable entry PG 9 (Ø 5 to 9 mm cable), and nipples for mounting of cable which is not included.
 Accessories: Cap type PPH of Polypropylene.
 Nuts type VM 0,5 with $\frac{1}{2}$ " pipe thread.
 type VM 1,0 with $1\frac{1}{2}$ " pipe thread.
 For fixing of the probe in thin container walls etc.
 VPP 1-0,5: With 1 electrode - Thread: $\frac{1}{2}$ " pipe thread.
 VPP 2-0,5: With 2 electrodes - Thread: $\frac{1}{2}$ " pipe thread.
 VPP 1-1,0: With 1 electrode - Thread: $1\frac{1}{2}$ " pipe thread.
 VPP 2-1,0: With 2 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.
 VPP 3-1,0: With 3 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.



The probes can be delivered with Hastelloy C electrodes under the type designation VPPH.
 Length of electrodes: 250 mm - Ø 4 mm.
 Insulation: Kynar (PVDF).

LEVEL PROBES

LEVEL PROBES TYPE VN

Screw fixing.
 Material: Nylon 6.
 Colour: Red.
 Thread: $1\frac{1}{2}$ " pipe thread.
 Temperature: Max. 90°C. (+ 194°F).
 Pressure: Max. 10 atm. at + 60°C. (+ 140°F).
 Electrodes: Material: Stainless 24.
 Length: 955 mm - Ø 5 mm.
 Mounting: Moulded, unscreened, grey PVC-cable.
 Length: 1 metre.
 Accessory: Nuts type VM 1,5 with $1\frac{1}{2}$ " pipe thread.
 For fixing of the probe in thin container walls etc.

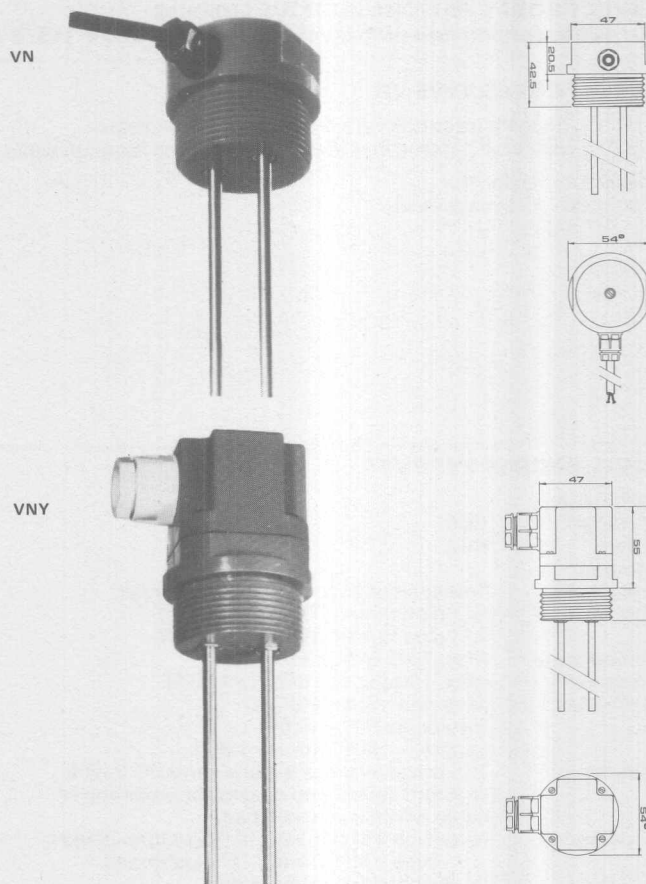
VN 1-1,5: With 1 electrode - Thread: $1\frac{1}{2}$ " pipe thread.
 VN 2-1,5: With 2 electrodes - Thread: $1\frac{1}{2}$ " pipe thread,
 VN 3-1,5: With 3 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.

The probes are available with electrodes insulated with PVC under the type designation VNI.

LEVEL PROBES TYPE VNY

Probe type VN is available in a variant with removable mounting head under the type designation VNY. The probe has a cable entry with PG 13,5 (Ø 9 to 13 mm cable) and nipples for mounting of cable which is not included. Other technical data as for probes type VN.

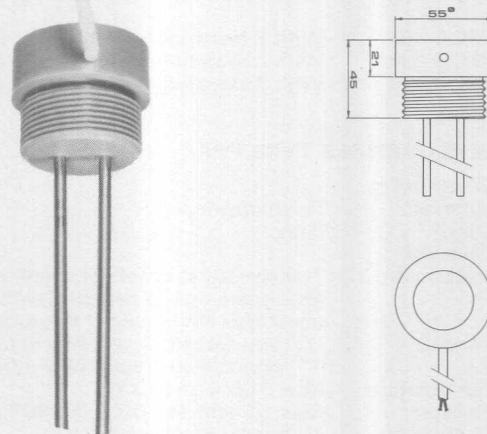
The probe is also available with electrodes insulated with polythene under the type designation VNYI.



LEVEL PROBES TYPE VT

Screw fixing.
 Material: Teflon.
 Colour: White.
 Thread: $1\frac{1}{2}$ " pipe thread.
 Temperature: Max. 150°C. (+ 302°F).
 Pressure: Max. 10 atm. at + 60°C. (+ 140°F).
 Electrodes: Material: Stainless 24.
 Length: 955 mm - Ø 5 mm.
 Mounting: Moulded, unscreened, grey silicone-cable.
 Length: 1 metre.
 Accessories: Nuts type VM 1,5 with $1\frac{1}{2}$ " pipe thread.
 For fixing of the probe in thin container walls etc.
 VT 1-1,5: With 1 electrode - Thread: $1\frac{1}{2}$ " pipe thread.
 VT 2-1,5: With 2 electrodes - Thread: $1\frac{1}{2}$ " pipe thread,
 VT 3-1,5: With 3 electrodes - Thread: $1\frac{1}{2}$ " pipe thread.

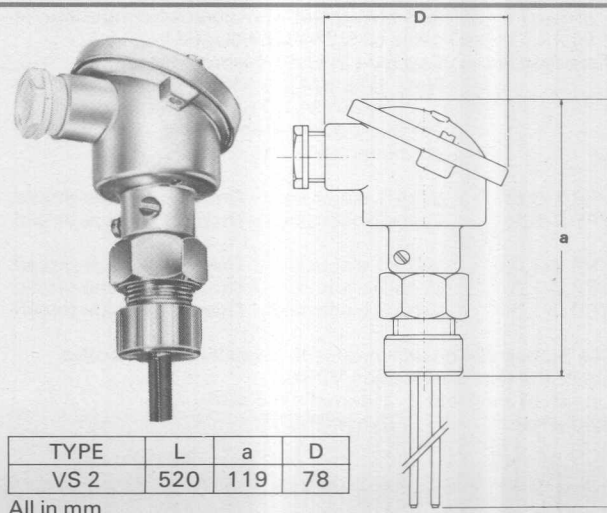
The probes are available with electrodes insulated with Teflon (PFTE) under the type designation VTI.



LEVEL PROBE TYPE VS 2

Level probe type VS is intended for the food industry, e.g. dairies - bacon factories - canned goods factories, etc., where the probe satisfies the hygiene requirements. The probe head is made partly of stainless steel, and the electrodes are of stainless steel with a coating of teflon. The probe has proofness IP 54.

Mounting: The probe is intended for welding together with containers etc.
 Materials: Electrodes: Stainless 24.
 Teflon-coated.
 Length: 400 mm.
 Head mounting: Light-alloy metal cast iron.
 Union nut: Stainless 24.
 Intermediate piece: Stainless 24.
 Threaded rod: Stainless 24.
 Gasket: Nitril rubber.



TYPE	L	a	D
VS 2	520	119	78

All in mm

LEVEL SENSORS

CAPACITIVE SENSORS FOR LIQUIDS AND GRANULATES For use in conjunction with level control SV 150/250

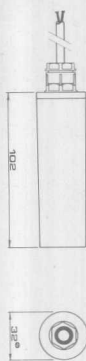
COMMON TECHNICAL DATA

Ambient pressure	Max. 10 atm. at 60°C (140°F).
Working frequency	Max. 500 Hz.
Supply voltage	Max. 30 V/1 KΩ (normally from SV 150/250).
Max. length of cable	100 metres.
Ambient temperature, cable	+ 70°C (+ 158°F).
Proofness	IP 67
Consumption (activated)	Max. 5 mA
Consumption (not-activated)	Min. 15 mA

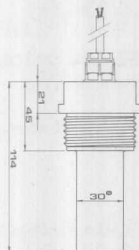
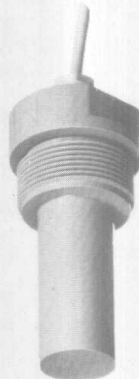
LEVEL SENSORS TYPE VR

VR 1 A	Hanging sensor Material Sensing distance Cable length Ambient temperature Colour	Nylon 6. 4 - 6 mm. 5 metres PVC cable. - 20°C to + 70°C (- 4°F to + 158°F). Grey.
VR 1 B	Hanging sensor Material Sensing distance Cable length Ambient temperature Colour	Nylon 6. 8 - 12 mm. 5 metres PVC cable. - 20°C to + 70°C (- 4°F to + 158°F). Red.
VR 2 A	Screw in sensor Material Thread Sensing distance Cable length Ambient temperature Colour Accessory	Nylon 6. 1 1/2" pipe thread. 4 - 6 mm. 1 metre PVC cable. - 20°C to + 80°C (- 4°F to + 176°F). Grey. Nut type VM 1,5 with 1 1/2" pipe thread.
VR 2 B	Screw in sensor Material Thread Sensing distance Cable length Ambient temperature Colour Accessory	Nylon 6. 1 1/2" pipe thread. 8 - 12 mm. 1 metre PVC cable. - 20°C to + 80°C (- 4°F to + 176°F). Red. Nut type VM 1,5 with 1 1/2" pipe thread.
VR 3 A	Screw in sensor Material Thread Sensing distance Cable length Ambient temperature Colour Accessory	Teflon. 1 1/2" pipe thread. 4 - 6 mm. 1 metre PVC cable. - 20°C to + 80°C (- 4°F to + 176°F). White. Nut type VM 1,5 with 1 1/2" pipe thread.
VR Y 2 B	Screw in sensor. Material Thread Sensing distance Mounting Ambient temperature Colour Accessories	Thermoplastic polyester (PBTP). 1 1/2" pipe thread. 8-12 mm. The sensor includes a cable entry PG 13.5 (Ø 9 to 13 mm cable), and nipples for mounting of cable which is not included. -20°C to +80°C (-4°F to +176°F). Red. Nut, type VM 1.5 with 1 1/2" pipe thread.

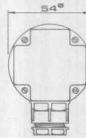
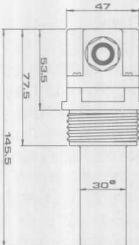
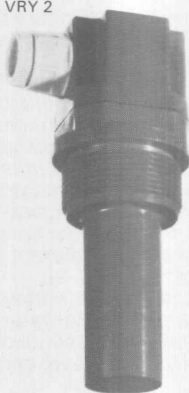
VR 1



VR 2
VR 3



VR Y 2



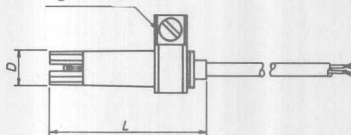
LEVEL SENSOR FOR SWIMMING POOLS ETC. For use in conjunction with level control SV 180/280

VJ 1	Hanging sensor (can be mounted on sidewall). Material Sensing tip Cable length Supply voltage Sensor current Max. cable length Proofness Ambient temperature	Grey glasfilled NORYL SE 1. Glass. 5 metres PVC cable. Max. 12 V. Max. 45 mA. 100 metres. IP 67. Max. + 70°C (+ 158°F).
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The sensing tip is made of glass and the sensing element is therefore galvanically isolated from the liquid.



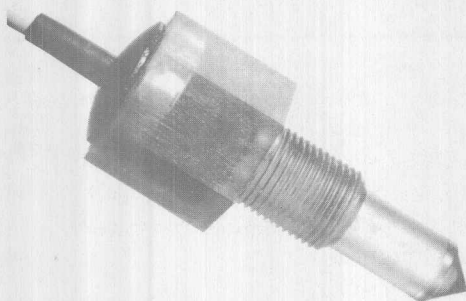
Mounting fixture



TYPE	L	D
VJ 1	48	11

All in mm

OPTICAL LEVEL PROBES



VP 1 E/VP 2 E

- * **Unmodulated**, infrared level probe for liquids.
- * With NPN output transistor with open collector, maximum 200 mA.
- * **VP 1 E:** Output-transistor »OFF«, when sensor tip is immersed in liquid.
- * **VP 2 E:** Output-transistor »ON«, when sensor tip is immersed in liquid.
- * No electrical or thermal connection between liquid and electrical circuit.
- * Supply voltage: 10-27 VDC.

SPECIFICATIONS

Supply voltage
10-27 VDC.

Ripple voltage
Max. 4 Vpp.

Current consumption
25 mA.

Open collector output
10-27 VDC.
The output is not protected against inductive loads.

Load
Max. 200 mA.

**Transistor »ON«
output level »low«**
Max. 1 VDC.

**Transistor »OFF«,
output level »high«**
Max. 27 VDC.

Ambient illumination
For reliable function:
0-100 lux.

Ambient temperature
-20°C to + 60°C
(- 4°F to +140°F).

Temperature of liquid
Short duration: Max. +100°C
(+212°F).

Proofness
IP 67.

Pressure
Max. 10 atm. at + 60°C
(+ 140°F).

Material
Polysulphone.

Weight
90 grams.

External thread
3/8" pipe thread.

Accuracy of measurement

At horizontal mounting the sensor is able to register a difference in the liquid level of ± 5 mm.
At vertical mounting: ± 2.5 mm.

Cable

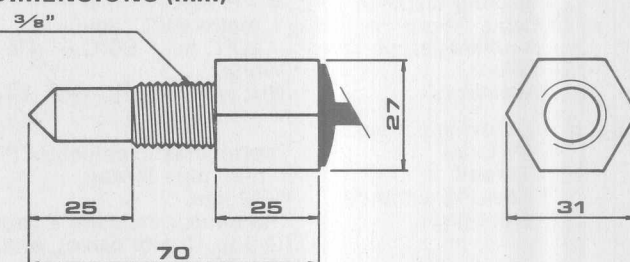
3-core PVC-cable.
2 metres, 3 x 0.40 mm²,
4.5 mm \varnothing .
Can be extended if necessary, however resistance:
Max. 100 Ω .

MODE OF OPERATION

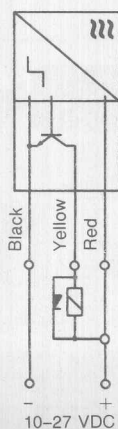
Optical level probe operating with infrared, unmodulated light. Applicable for the detection of liquids. The sensor is completely self-contained in a corrosion-resistant house made of Polysulphone being resistant to most acids and bases. The sensor contains amplifier, Ga-As diode, phototransistor and NPN output-transistor with open collector, max. 200 mA. The conical tip of the sensor rod forms and angle of 90°. This angle acts as a prism, i.e. the beam, emitted from the Ga-As diode placed in one side of the sensor head, is reflected internally to the phototransistor placed in the other side of the sensor head (fig. 1), provided that the tip of the sensor is situated in air. If the sensor tip is immersed in a liquid always having a refractive index different from that of air, the beam will be refracted into the liquid (fig. 2). Both types of sensors can operate without any kind of accessory, e.g. in oil, petrol, clear water, waste water, various aqueous solutions as e.g. milk, beer, wine and alcohol. The VP 2 E sensor is applicable for MAX. and/or MIN. level control in conjunction with S-system, type SV 190.

At high light intensity and/or adhesive liquids, it is recommended to use optical level probes with modulated light, type VP 1 EM or VP 2 EM.

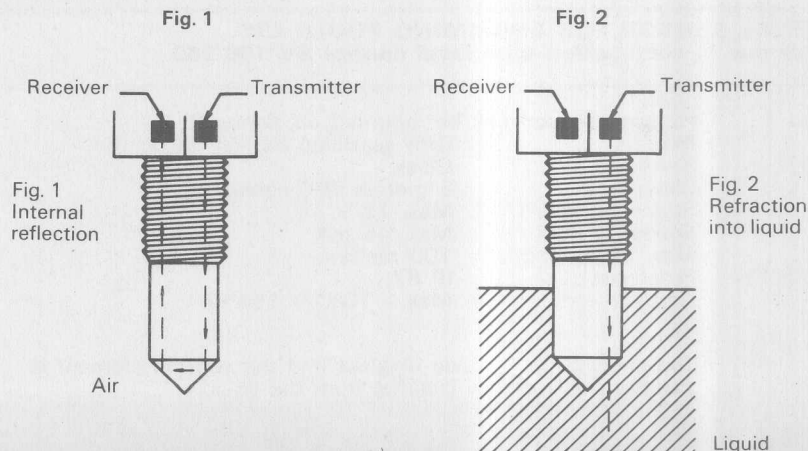
DIMENSIONS (mm)



CONNECTION DIAGRAM



FUNCTIONAL PRINCIPLE



OPTICAL LEVEL PROBES

VP 1 EM/VP 2 EM

- * **Modulated, infrared level probe for liquids.**
- * **With NPN output transistor with open collector, maximum 200 mA.**
- * **VP 1 EM: Output »OFF« when sensor in liquid.**
VP 2 EM: Output »ON« when sensor in liquid.
- * **No electrical or thermal connection between liquid and electrical circuit.**
- * **Supply voltage: 11-27 VDC.**

SPECIFICATIONS

Supply voltage
11-27 VDC.
Polarity protected.

Ripple voltage
Maximum 4 V_{pp}.

Current consumption
15 mA.

Open collector output
Maximum 27 VDC.
Maximum 200 mA.
Protected against inductive loads.

Transistor »ON« output level »low«
Maximum 1 VDC.

Transistor »OFF« output level »high«
Maximum 27 VDC.

Ambient illumination
0-50,000 lux.

Ambient temperature
-20°C to +80°C
(-4°F to +176°F).

Temperature of liquid
Short duration:
Maximum +100 °C
(+212°F).

Proofness
IP 67.

Pressure
Max. 10 atm. at +60°C
(+140°F).

Material
Polysulphone.

Weight
90 grams.

External thread
3/8" pipe thread.

Accuracy of measurement
At horizontal mounting the sensor is able to register a difference in the liquid level of ±5 mm.
At vertical mounting: ±2.5 mm.

Cable
3-core PVC-cable.
2 metres, 3 x 0.40 mm²,
4.5 mm Ø.
Can be extended if necessary,
however resistance:
Max. 100 Ω.

MODE OF OPERATION

Optical level probe for the detection of liquids.
The sensor is completely self-contained in a corrosion-resistant house made of polysulphone being resistant to most acids and bases.

The probe contains IR transmitter, receiver, amplifier and NPN output transistor with open collector.

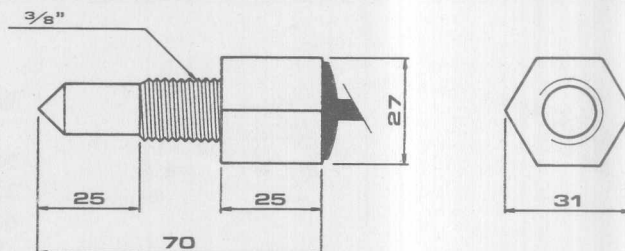
The light source is a Ga-As diode emitting modulated, infrared light in short pulses. This level probe is thus insensitive to ambient illumination (up to 50,000 lux) and suitable even for adhesive liquids.

The conical tip of the sensor rod forms an angle of 90°. This angle acts as a prism, i.e. the beam, emitted from the Ga-As diode placed in one side of the sensor head, is reflected internally to the phototransistor placed in the other side of the sensor head (fig. 1), provided that the tip of the sensor is situated in air. If the sensor tip is immersed in a liquid, the beam will be refracted into the liquid (fig. 2).

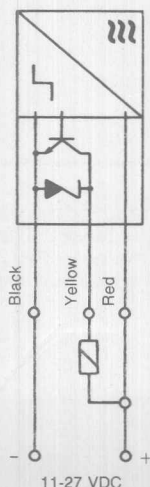
Both types of sensors can operate in oil, waste water etc. without any kind of accessory.

The VP 2 EM sensor is applicable for MAX. and/or MIN. level control in conjunction with S-system, type SV 190.

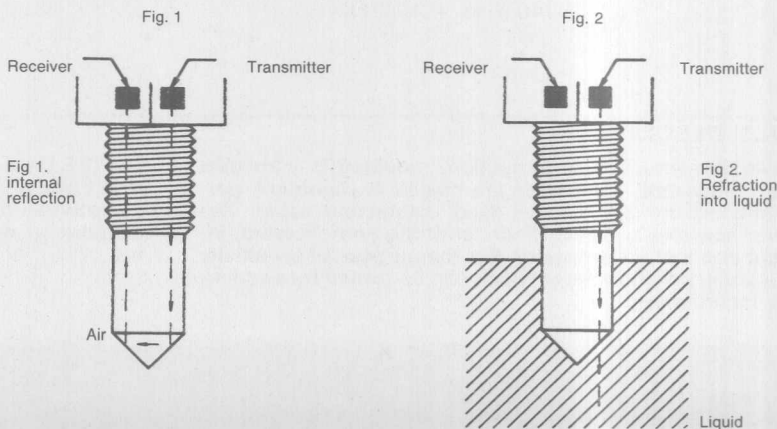
DIMENSIONS (mm)



CONNECTION DIAGRAM



FUNCTIONAL PRINCIPLE





- ## TECHNICAL DATA FOR TRANSMITTER

TECHNICAL DATA FOR RECEIVER

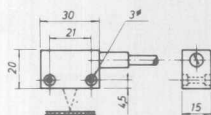
PRODUCT DESCRIPTION

See illustrations.

Ambient temperature: -40°C to $+50^{\circ}\text{C}$ (-40°F to $+122^{\circ}\text{F}$).

Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the transmitter/receiver and the reflector. Maximum distance to reflector: 100 mm.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light, the sensing distance cannot be stated generally: It depends on the shape, colour and surface of the individual object.



IRE 0,03

- * **Retro-reflective head with unmodulated, infrared light.**
- * **Combined transmitter and receiver. (Transceiver).**
- * **Operating distance: 30 mm.**
- * **Ambient temperature: - 40°C to + 50°C.**
- * **Material: Anodized aluminium.**

TECHNICAL DATA FOR TRANSMITTER

Wavelength of the light: 940 nm (9400 Å). Invisible.
 Connection cable: Unscreened, grey PVC cable.
 Standard length: 1,5 metres.
 Can be extended if necessary,
 max. resistance: 2 Ω.
 Current: 100 mA.
 Voltage: 1.4 VDC.
 Proofness: IP 50.
 Ambient temperature: - 40°C to + 50°C.
 (- 40°F to + 122°F).

TECHNICAL DATA FOR RECEIVER

Sensing speed: Max. 20 KHz.
With SE 100: Max. 10 Hz.
With T-system: Max. 1000 Hz.
With COUNTOMATIC counters:
Max. 1000 Hz.

Rise- and fall time: 60 μ s.

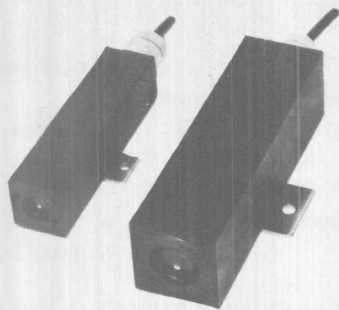
Current/voltage: Max. 100 mA/50 VDC.

Power loss at +25°C: Max. 300 mW.

Dark current: 5 μ A.

PRODUCT DESCRIPTION

The IRE 0,03-transceiver is intended for the detection of individual objects situated in front of the lenses. The nominal distance between the transceiver and the object is 30 mm being the distance at which a plane, dead white surface is safely detected.

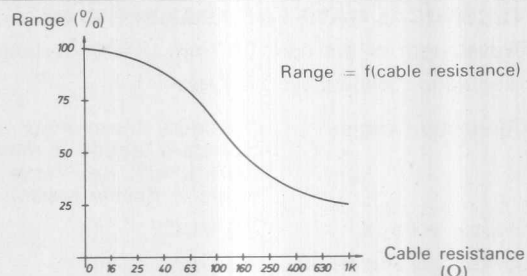


MATR 5/10/20

- * Photosensors with infrared, modulated light.
- * Separate transmitters and receivers.
- * Operating distance: **MATR 5: 5 metres**
MATR 10: 10 metres
MATR 20: 20 metres.
- * Ambient temperature: **- 20°C to + 60°C.**
(- 4°F to + 140°F).
- * Proofness: **IP 67.**
- * Material: **Black, glassfilled ACETAL.**

TECHNICAL DATA FOR TRANSMITTER

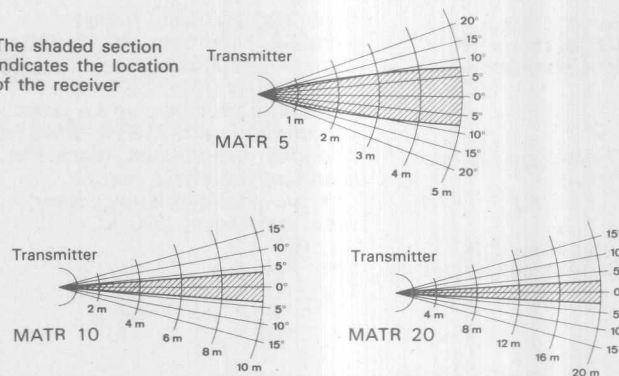
Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of range = f (cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 The counters can only be used in conjunction with MATR 5/MATR 10.
 Connection cable: Moulded, unscreened, black PVC cable.
 Standard length: 2 metres.
 Can be extended if necessary, max. resistance: 100 Ω.
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: MAR 5: 1 mA.
 MAR 10: 1 mA.
 MAR 20: 4 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MAT) and receiver (MAR) moulded in identical »A-enclosures«, i.e. enclosures with square cross section and with the lens placed in the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator which modulates the light with a frequency of 8 KHz.
 The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figures being part of the type designation indicate the maximum distance in metres between transmitter and receiver. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them. In cases where semi-transparent or very small objects must be detected, it might be necessary to reduce the amount of light which reaches the phototransistor.

For that purpose two circular discs with a central hole in two different sizes are supplied with each MAR 5 receiver. Any of the discs may be clipped on the receiver in front of the lens, also resulting in a reduction of the maximum operating distance to 1 or 3 metres respectively.

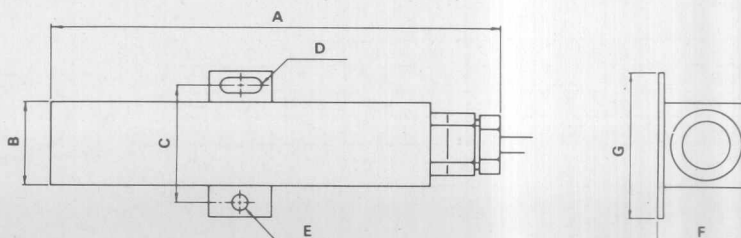
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The maximum distance to the reflector equals 50 % of the maximum distance as indicated by the number being part of the type designation, provided that reflector type ER 22 is used.

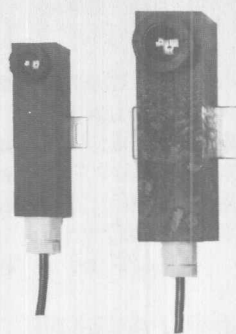
Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)

	A	B	C	D	E	F	G
MATR 5	97	20 [□]	28	3,3 [°]	3,3 [°]	21,5	35
MATR 10	122	30 [□]	40	4,5 [°]	4,5 [°]	32	50
MATR 20	122	30 [□]	40	4,5 [°]	4,5 [°]	32	50





MBTR 5/10/20

- * Photosensors with infrared, modulated light.
- * Separate transmitters and receivers.
- * Operating distance: MBTR 5: 5 metres
MBTR 10: 10 metres
MBTR 20: 20 metres.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 67.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

Wavelength of the light: 940 nm (9400 Å). Invisible.

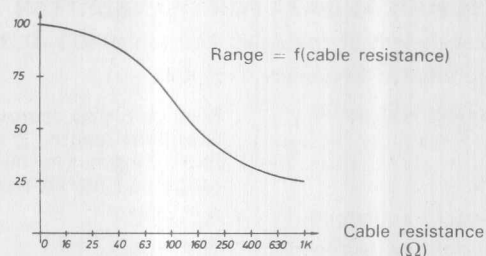
Modulation frequency: 8 KHz.

Connection cable: Moulded, unscreened, grey PVC cable.
Standard length: 2 metres.
Extra length, see curve of
range = f(cable resistance).

Supply voltage: 3.5 VDC.

Current consumption: 100 mA.

Range (%)



TECHNICAL DATA FOR RECEIVER

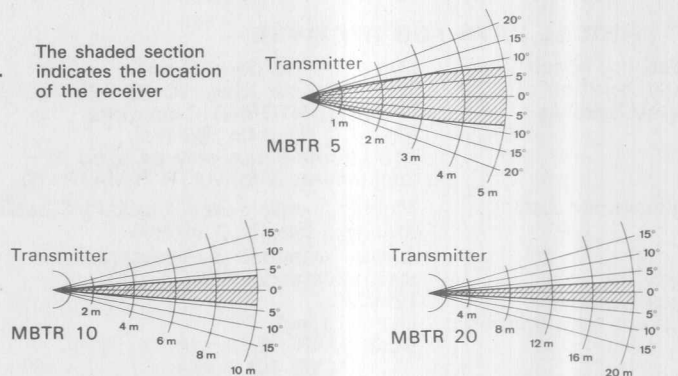
Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
With SE 110: Max. 10 Hz (Min. 50 ms).
With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).

Connection cable: The counters can only be used in conjunction with MBTR 5/MBTR 10.
Moulded, unscreened, black PVC cable.
Standard length: 2 metres.
Can be extended if necessary, max. resistance: 100 Ω.

Supply voltage: 12 VDC.

Current consumption: Lit: 15 mA.
Dark: MBR 5: 1 mA.
MBR 10: 1 mA.
MBR 20: 4 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MBT) and receiver (MBR) moulded in identical »B-enclosures«, i.e. enclosures with square cross section and with the lens placed perpendicularly on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

On the lens side of the enclosure a connection diagram is printed. On the 3 other sides, threaded holes for fixing the mounting bracket are drilled.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figures being part of the type designation indicate the maximum distance in metres between transmitter and receiver. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them.

In cases where semi-transparent or very small objects must be detected, it might be necessary to reduce the amount of light which reaches the phototransistor. For that purpose two circular discs with a central hole in two different sizes are supplied with each MBR 5-receiver. Any of the discs may be clipped on the receiver in front of the lens, also resulting in a reduction of the maximum operating distance to 1 or 3 metres respectively.

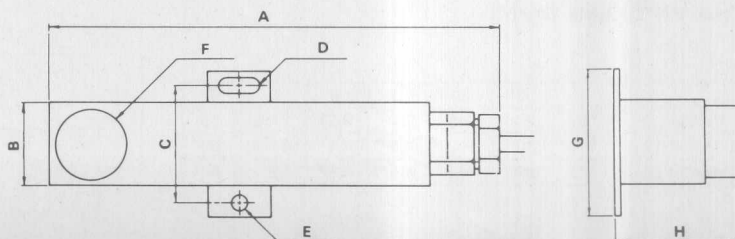
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The maximum distance to the reflector equals 50 % of the maximum distance as indicated by the number, being part of the type designation, provided that reflector type ER 22 is used.

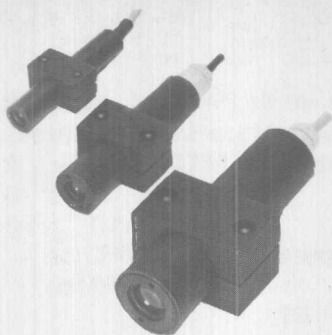
Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)

	A	B	C	D	E	F	G	H
MBTR 5	97	20 [□]	28	3,3 [°]	3,3 [°]	17 [°]	35	29,5
MBTR 10	122	30 [□]	40	4,5 [°]	4,5 [°]	26 [°]	50	44,5
MBTR 20	122	30 [□]	40	4,5 [°]	4,5 [°]	26 [°]	50	44,5



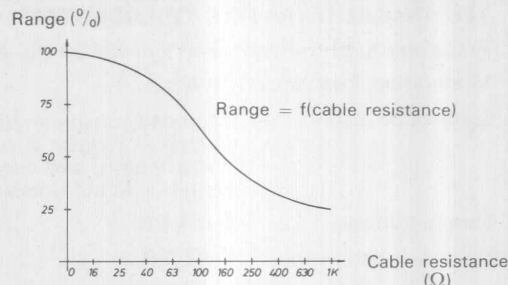


MCTR 2,5/5/10

- * Photosensors with infrared, modulated light.
- * Separate transmitters and receivers.
- * Operating distance: **MCTR 2,5: 2,5 metres**
MCTR 5 : 5 metres
MCTR 10 : 10 metres.
- * Ambient temperature: **- 20°C to + 60°C.**
(- 4°F to + 140°F).
- * Proofness: **IP 67.**
- * Material: **Black, glassfilled ACETAL.**

TECHNICAL DATA FOR TRANSMITTER

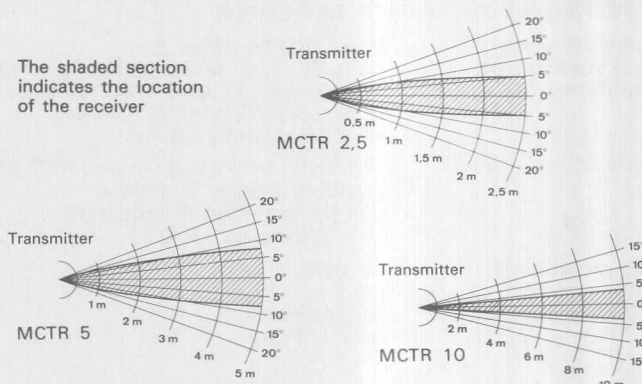
Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: Max. 100 Hz (Min. 5 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 Connection cable: Moulded, unscreened, black PVC cable.
 Standard length: 2 metres.
 Can be extended if necessary, max. resistance: 100 Ω.
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 1 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MCT) and receiver (MCR) moulded in identical »C-enclosures«, i.e. enclosures with circular cross section and with the lens placed on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figures being part of the type designation indicate the maximum distance in metres between transmitter and receiver. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them. In cases where semi-transparent or very small objects must be detected, it might be necessary to reduce the amount of light which reaches the phototransistor.

For that purpose two circular discs with a central hole in two different sizes are supplied with each MCR 5 receiver. Any of the discs may be clipped on the receiver in front of the lens, also resulting in a reduction of the maximum operating distance to 1 or 3 metres respectively.

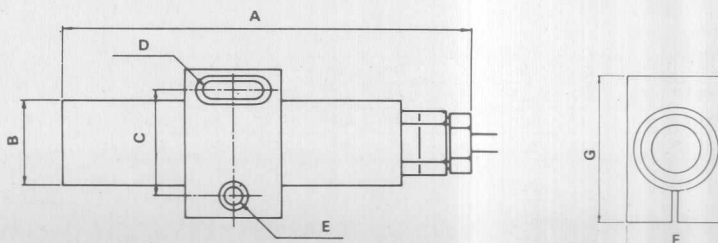
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and the transmitter/receiver. The maximum distance to the reflector equals 50 % of the maximum distance as indicated by the number, being part of the type designation, provided that reflector type ER 22 is used.

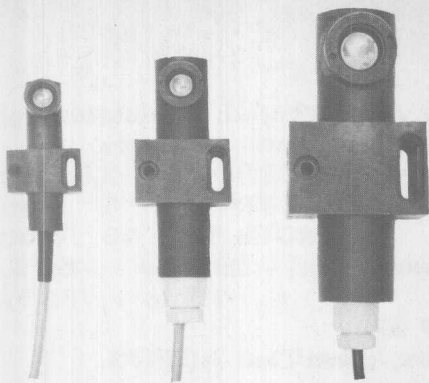
Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)

	A	B	C	D	E	F	G
MCTR 2,5	82	13°	19,5	3,5°	3,2°	16	27
MCTR 5	97	20°	25	4,5°	4,2°	23	35
MCTR 10	122	30°	37	6°	5°	33	50





MDTR 2,5/5/10

- * Photosensors with infrared, modulated light.
- * Separate transmitters and receivers.
- * Operating distance: MDTR 2,5: 2,5 metres
MDTR 5 : 5 metres
MDTR 10 : 10 metres.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 67.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

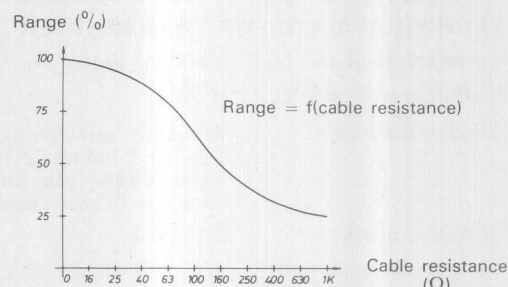
Wavelength of the light: 940 nm (9400 Å). Invisible.

Modulation frequency: 8 KHz.

Connection cable: Moulded, unscreened, grey PVC cable.
Standard length: 2 metres.
Extra length, see curve of
range = f(cable resistance).

Supply voltage: 3.5 VDC.

Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

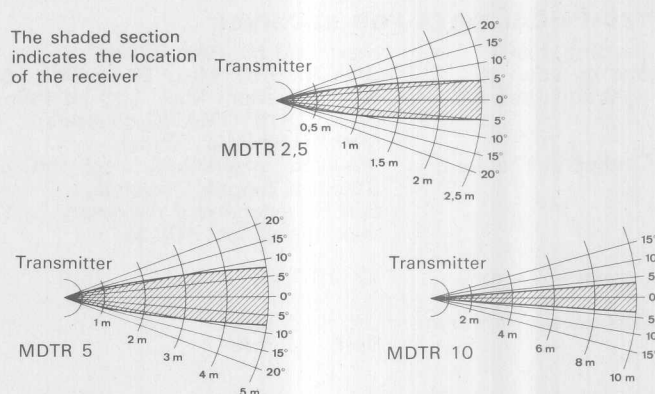
Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
With SE 110: Max. 10 Hz (Min. 50 ms).
With T-system: Max. 100 Hz (Min. 5 ms).
With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).

Connection cable: Moulded, unscreened, black PVC cable.
Standard length: 2 metres.
Can be extended if necessary,
max. resistance: 100 Ω.

Supply voltage: 12 VDC.

Current consumption: Lit: 15 mA.
Dark: 1 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MDT) and receiver (MDR) moulded in identical »D-enclosures«, i.e. enclosures with circular cross section and with the lens placed perpendicularly on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figures being part of the type designation indicate the maximum distance in metres between transmitter and receiver. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them. In cases where semi-transparent or very small objects must be detected, it might be necessary to reduce the amount of light which reaches the phototransistor.

For that purpose two circular discs with a central hole in two different sizes are supplied with each MDR 5 receiver. Any of the discs may be clipped on the receiver in front of the lens, also resulting in a reduction of the maximum operating distance to 1 or 3 metres respectively.

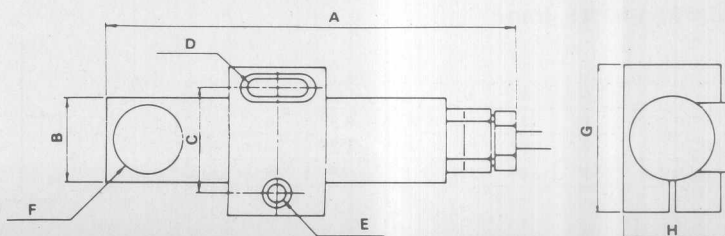
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The maximum distance to the reflector equals 50 % of the maximum distance as indicated by the number being part of the type designation, provided that reflector type ER 22 is used.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)

	A	B	C	D	E	F	G	H
MDTR 2,5	82	13,5°	19,5	3,5°	3,2°	13,5°	27	23,5
MDTR 5	97	20°	25	4,5°	4,2°	16,7°	35	25,5
MDTR 10	122	30°	37	6°	5°	26°	50	35,5



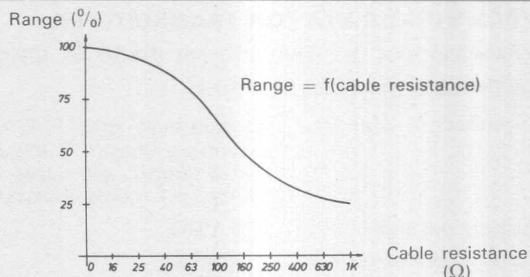


MED 10/10A

- * Retro-reflective head with infrared, modulated light.
- * Combined transmitter and receiver. (Transceiver).
- * Operating distance: 10 metres.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 50.
- On request: IP 57.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Unscreened, grey PVC cable.
 Standard length: 2 metres, 3 x 0.4 mm²
 Extra length, see curve of
 range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.

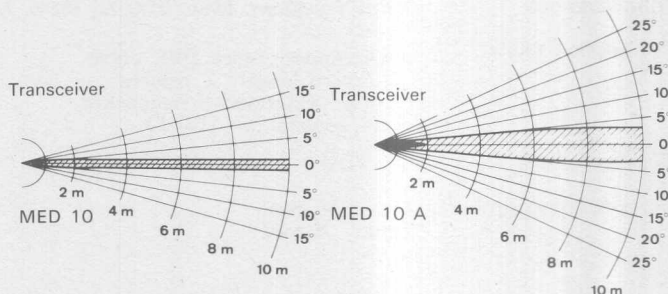


TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: Max. 100 Hz (Min. 5 ms).
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 4 mA.

The shaded section indicates the location of the reflector

The black section indicates the location of the object at direct object reflection



PRODUCT DESCRIPTION

Transmitter and receiver combined in one »E-enclosure«, i.e. an enclosure with rectangular cross section and with its 2 lenses placed perpendicularly to the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

Photosensors using the »E-enclosure« have in their standard design proofness IP 50 and in their special design proofness IP 57.

Different mounting brackets are used for the two designs, thus a sheet metal bracket for the standard design and a cast metal bracket with ball-and-socket joint for the special design. Unless otherwise specified the standard design with sheet metal bracket is supplied.

The ball-and-socket joint mounting bracket can also be ordered separately. Type designation: KB 1.

The transmitter section of the transceiver (lower lens) contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver section (upper lens) contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

The figures being part of the type designation indicate the maximum distance in metres between the transceiver and a 10 x 10 cm reflector, thus the ER 22.

Detection in conjunction with a reflector.

By this mode of detection the MED 10 transceiver is used, which in conjunction with the above-mentioned reflector has an operating range up to 10 metres, whereby objects passing between the transceiver and the reflector are detected.

Detection by reflection from objects.

The MED 10 A detects reflected light from a much wider angle than the MED 10.

Therefore, the MED 10 A is especially suitable for detecting objects by their own reflection.

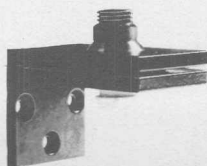
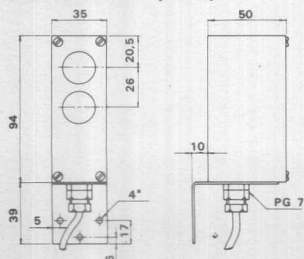
The maximum possible distance between the MED 10 A transceiver and an object cannot be stated generally as it depends on the shape, colour and surface of the individual objects.

However, light reflected from an object having a plane, dead white surface, is with certainty detected at distances above 15 and up to 130 cm, which gives an idea of possible MED 10 A applications.

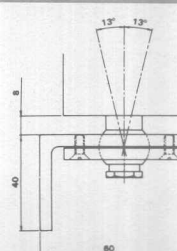
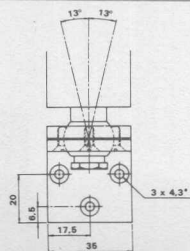
Always adjust transceivers to their maximum lit current by means of an ammeter (mA), coupled in series with the red core of the transceiver cable.

Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)



KB 1



METR 50/100

- * **Photosensors with infrared, modulated light.**
- * **Separate transmitters and receivers.**
- * **Operating distance: METR 50: 50 metres**
METR 100: 100 metres.
- * **Ambient temperature: - 20°C to + 60°C.**
(- 4°F to + 140°F).
- * **Proofness: IP 50.**
On request: IP 57.
- * **Material: Black, glassfilled ACETAL.**

TECHNICAL DATA FOR TRANSMITTER

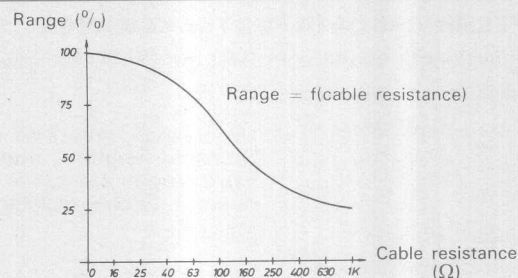
Wavelength of the light: 940 nm (9400 Å). Invisible.

Modulation frequency: 4 KHz.

Connection cable: Unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of
 range = f (cable resistance).

Supply voltage: 3.5 VDC.

Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed
and duration of
light/darkness

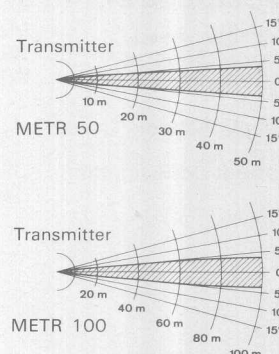
Max. 100 Hz (Min. 5 ms).
With SE 110: Max. 10 Hz (Min. 50 ms).
With T-system: Max. 100 Hz (Min. 5 ms).

Connection cable: Unscreened, black PVC cable.
Standard length: 2 metres.
Can be extended if necessary,
max. resistance: 100 Ω .

Supply voltage: 12 VDC.

Current consumption: Lit: 15 mA.
Dark: 4 mA.

The shaded section indicates the location of the receiver.



PRODUCT DESCRIPTION

Separate transmitter (MET) and receiver (MER) in identical »E-enclosures«, i.e. enclosures with rectangular cross section and with the lens placed perpendicularly on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

Photosensors using the »E-enclosure« have in their standard design proofness IP 50 and in their special design proofness IP 57. Different mounting brackets are used for the two designs, thus a sheet metal bracket for the standard design and a cast metal bracket with ball-and-socket joint for the special design. Unless otherwise specified the standard design with sheet metal bracket is delivered. The ball-and-socket joint mounting bracket can also be ordered separately. Type designation: KB 1.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 4 KHz. The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

The figures being part of the type designation indicate the maximum distance in metres between transmitter and receiver.

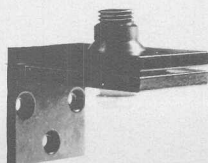
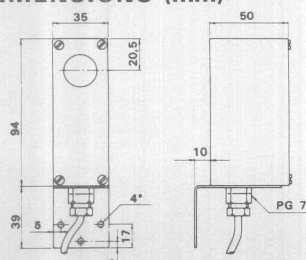
Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them.

Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The maximum distance to the reflector equals 50 % of the maximum distance as indicated by the numbers, being part of the type designation, provided that reflector type ER 22 is used.

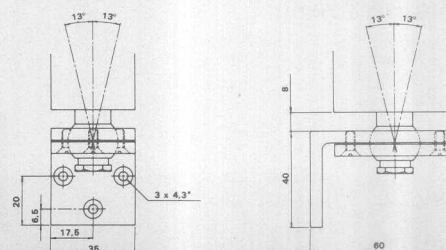
Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance between transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface on the individual object, as well as on the angle between the transmitter and the receiver.

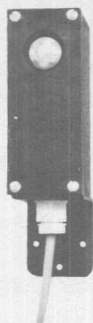
Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

DIMENSIONS (mm)



KB 1





METRM 10

- * Photosensor with infrared, modulated light.
- * Separate transmitter and receiver.
- * Built-in power supply, amplifier and output relay.
- * Operating distance: 10 metres.
- * LED-adjustment-indicator.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 50. On request: IP 57.
- * Material: Black, glassfilled ACETAL.

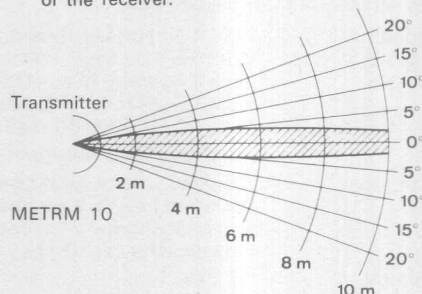
TECHNICAL DATA FOR TRANSMITTER

Supply voltage:	24 - 120 or 220 VAC \pm 10 %, 45 - 65 Hz.
Consumption:	2 VA.
Wavelength of the light:	940 nm (9400 Å). Invisible.
Modulation frequency:	8 KHz.
Connection cable:	Unscreened, grey PVC cable. Standard length: 2 metres. Can be extended if necessary.

TECHNICAL DATA FOR RECEIVER

Supply voltage:	24 - 120 or 220 VAC \pm 10 %, 45 - 65 Hz.
Consumption:	2 VA.
Sensing speed:	20 Hz.
Duration of light/darkness:	Min. 25 ms/Min. 25 ms.
Built-in output relay:	1 pole make contact, internally connected to the supply voltage. Max. 5 A, 1250 VA - Resistive load.
Connection cable:	Unscreened, black PVC cable. Standard length: 2 metres. Can be extended if necessary.

The shaded section indicates the location of the receiver.



PRODUCT DESCRIPTION

Separate transmitter (METM) and receiver (MERM) in identical »E-enclosures«, i.e. enclosures with rectangular cross section and with the lens placed perpendicularly on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The METRM 10 forms a completely selfcontained set of photosensors incorporating all necessary electronic circuits plus mains transformers and power relay. The METRM 10 is therefore suitable for direct operation on AC standard voltages. See circuit diagram below.

The transmitter (METM 10) contains a Ga-As diode, emitting infra-red light, as well as an oscillator which modulates the light with a frequency of 8 KHz.

The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver completely insensitive to environmental light.

Photosensors using the »E-enclosure« have in their standard design proofness IP 50 and in their special design proofness IP 57.

Different mounting brackets are used for the two designs, thus a sheet metal bracket for the standard design and a cast metal bracket with ball-and-socket joint for the special design.

Unless otherwise specified the standard design with sheet metal bracket is supplied.

The ball-and-socket joint mounting bracket can also be ordered separately. Type designation: KB 1.

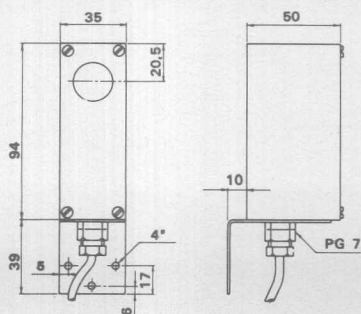
Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between.

Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector and objects are passing between the reflector and the transmitter/receiver. The maximum distance of the reflector equals 50 % of the maximum distance as indicated by the figures being part of the type designation provided that reflector type ER 22 is used.

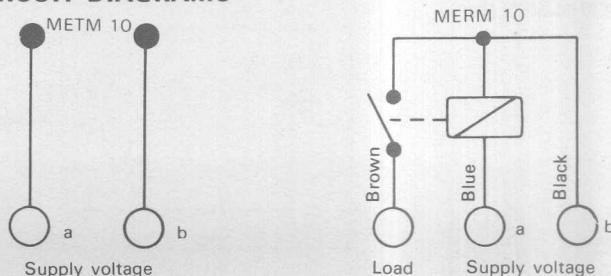
Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Behind the lens of the receiver a red light emitting diode is situated. The diode gives the brightest light when the best adjustment is achieved.

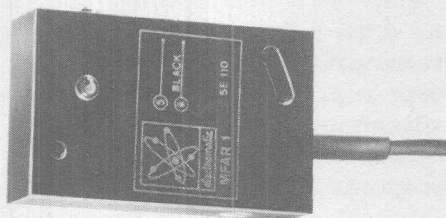
DIMENSIONS (mm)



CIRCUIT DIAGRAMS



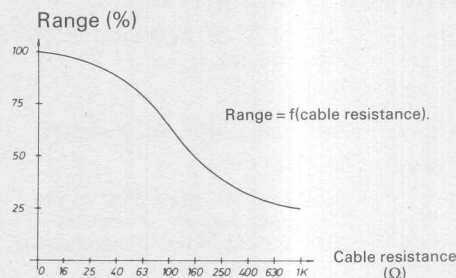
MFATR 1



- * Photosensors with infrared, modulated light.
- * Separate transmitter and receiver.
- * Operating distance: 1 metre.
- * Light-emitting diode on transmitter and receiver.
- * Ambient temperature: -20°C to $+60^{\circ}\text{C}$.
(-4°F to $+140^{\circ}\text{F}$).
- * Proofness: IP 67.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

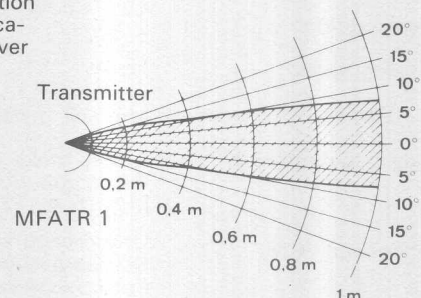
Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Red LED: Indicates emission of IR light.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: Max. 100 Hz (Min. 5 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 Red LED: Indication for adjustment.
 Connection cable: Moulded, unscreened, black PVC cable.
 Standard length: 2 metres.
 Can be extended if necessary, max. resistance: 100 Ω.
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 1 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MFAT) and receiver (MFAR) moulded in identical »F-enclosures«, i.e. enclosures with rectangular cross section and with the lens placed on the largest side of the house. This makes the sensors applicable for mounting in doorways (see Dimensions below). The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along. This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figure being part of the type designation indicates the maximum distance in metres between transmitter and receiver, thus 1 metre. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them.

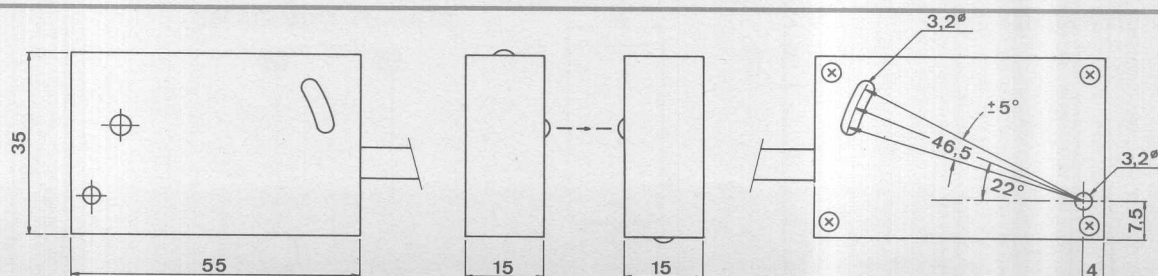
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The total maximum length between transmitter, reflector type ER 22, and receiver is 1 metre.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

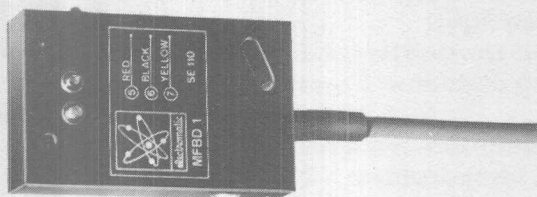
Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

However, to facilitate quick installation with good accuracy even without an instrument a red light-emitting diode is mounted on the receiver indicating the accuracy of adjustment. The red light-emitting diode on the transmitter indicates emission of IR light.

DIMENSIONS (mm)



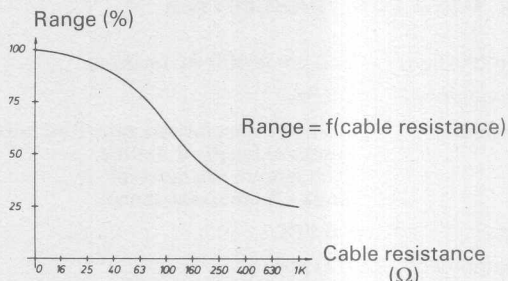
MFAD 1/MFBD 1



- * Retro-reflective head with infrared, modulated light.
- * Combined transmitter/receiver. (Transceiver).
- * Operating distance: 1 metre.
- * MFBD 1 with built-in potentiometer.
- * LED-indication for adjustment.
- * Ambient temperature: -20°C to $+60^{\circ}\text{C}$.
(-4°F to $+140^{\circ}\text{F}$).
- * Proofness: MFAD 1: IP 67 - MFBD 1: IP 52.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres, $3 \times 0.4 \text{ mm}^2$.
 Extra length, see curve of range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



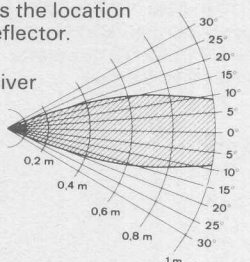
TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: Max. 100 Hz (Min. 5 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 Red LED: Indicates accuracy of adjustment.
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 1 mA.

The shaded section indicates the location of the reflector.

Transceiver

MFAD 1
MFBD 1



PRODUCT DESCRIPTION

Transmitter and receiver (transceiver) moulded in one joint »F-enclosure«, i.e. an enclosure with rectangular cross section and with its 2 lenses placed on the largest side of the house. This makes the sensor applicable for mounting in doorways (see Dimensions below).

The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter section contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver section contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along.

This feature makes the receiver insensitive to environmental light.

All components of the transceiver type MFAD 1 are firmly embedded in a resin which makes it not only watertight (IP 67) but also insensitive to shock and vibration. Proofness IP 52 for the MFBD 1 because of the built-in trimming potentiometer.

The figures being part of the type designation indicate the maximum distance in metres between the transceiver, and a $10 \times 10 \text{ cm}$ reflector, thus the ER 22. The MFAD 1 has a maximum operating range of 1 metre, and the MFBD 1 has a built-in trimming potentiometer by which the operating range can be adjusted with a screwdriver between 0 and 1 metre (see table of range).

In conjunction with COUNTOMATIC counters the maximum distance of the photosensors is reduced by 50 %.

Detection in conjunction with a reflector is possible. The transceivers can operate in conjunction with the ER 22 reflector at distances up to 1 metre, whereby objects passing between the transceiver and the reflector are detected.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance from the transceiver to an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object.

However, light reflected from an object having a plane, dead white surface, is with certainty detected at distances of up to 15 cm.

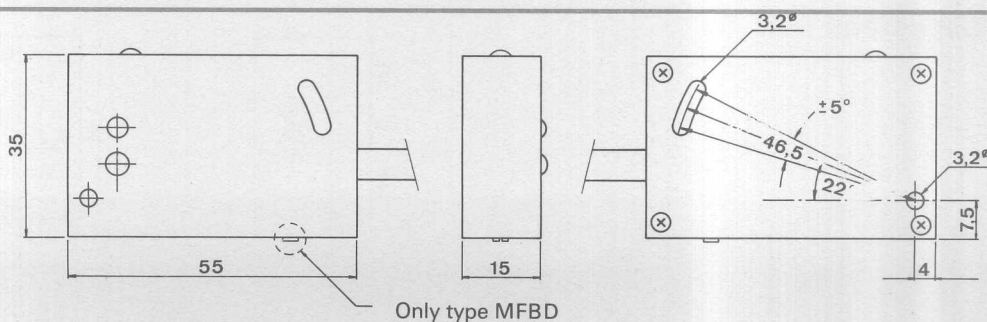
Always adjust transceivers to their maximum lit current by means of an ammeter (mA), coupled in series with the red core of the transceiver cable. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

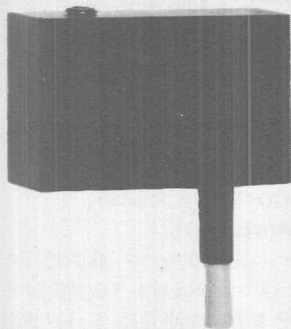
However, quick adjustment with good accuracy is also possible without an instrument. On one side of the transceiver a red light-emitting diode is situated. This diode gives the brightest light, when the best adjustment is achieved.

Range of the MFBD 1

Type of object	Minimum setting of potentiometer	Maximum setting of potentiometer
Kodak Test-Card	1- 3 cm	1- 15 cm
Reflector Type ER 22	1-50 cm	0-100 cm

DIMENSIONS (mm)



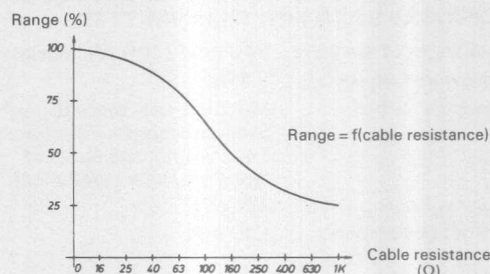


MFC D 1

- * Retro-reflective head with infrared, modulated light.
- * Combined transmitter and receiver. (Transceiver).
- * Operating distance: 1 metre.
- With built-in potentiometer.
- * LED-adjustment-indicator.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 52.
- * Material: Black, glassfilled ACETAL.

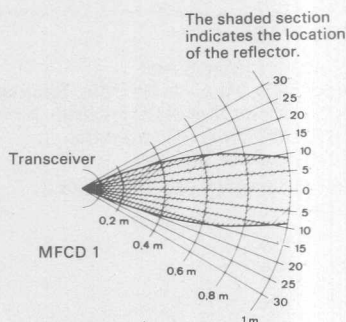
TECHNICAL DATA FOR TRANSMITTER

Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: max. 100 Hz (Min. 5 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 1 mA.



PRODUCT DESCRIPTION

Transmitter and receiver (transceiver) moulded in one joint »F-enclosure«, i.e. an enclosure with rectangular cross section and with its 2 lenses placed perpendicularly on the longitudinal axis of the enclosure.

The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter section (lower lens) contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver section (upper lens) contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along.

This feature makes the receiver insensitive to environmental light.

The figure being part of the type designation indicates the maximum distance in metres between the transceiver and a reflector of 10x10 cm (e.g. the ER 22).

By means of the built-in trimming potentiometer the operating range can be adjusted with a screwdriver between 0 and 1 metre (see table of range).

In conjunction with COUNTOMATIC counters the maximum distance is halved.

Detection in conjunction with a reflector.

The transceiver can be operated in conjunction with the ER 22 reflector, whereby objects passing between the transceiver and the reflector are detected.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance from the transceiver to an object cannot be stated generally. The distance depends on the shape colour and surface of the individual object. See table below.

Always adjust transceivers to their maximum lit current by means of an ammeter (mA), coupled in series with the red core of the transceiver cable.

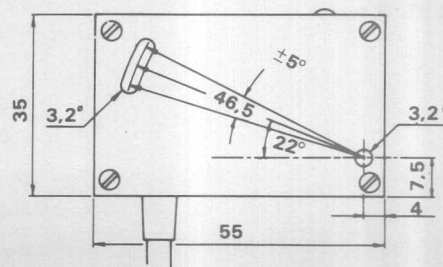
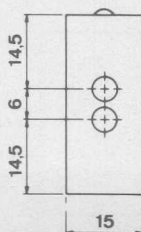
Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

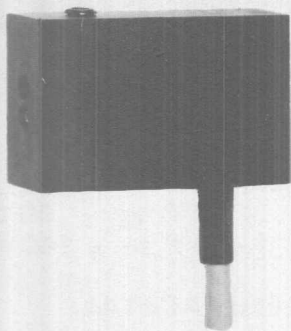
However, quick adjustment with good accuracy is also possible without an instrument. On the top edge of the transceiver a red light-emitting diode is mounted. This diode gives the brightest light when the best adjustment is achieved.

Range of the MFC D 1

Type of object	Minimum setting of potentiometer	Maximum setting of potentiometer
Kodak Test-Card	1- 3 cm	1- 15 cm
Reflector type ER 22	1-50 cm	0-100 cm

DIMENSIONS (mm)





MFD 1/MFD 2

- * Retro-reflective head with infrared, modulated light.
- * Combined transmitter and receiver. (Transceiver).
- * Operating distance: MFD 1: 1 metre.
MFD 2: 2 metres.
- * LED-adjustment-indicator.
- * Ambient temperature: - 20°C to + 60°C.
(- 4°F to + 140°F).
- * Proofness: IP 67.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

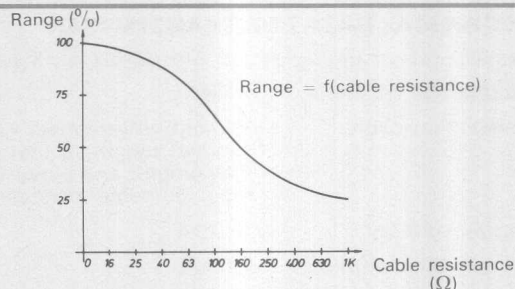
Wavelength of the light: 940 nm (9400 Å). Invisible.

Modulation frequency: 8 KHz.

Connection cable: Moulded, unscreened, grey PVC cable.
Standard length: 2 metres, 3 x 0.4 mm².
Extra length, see curve of range = f(cable resistance).

Supply voltage: 3.5 VDC.

Current consumption: 100 mA.



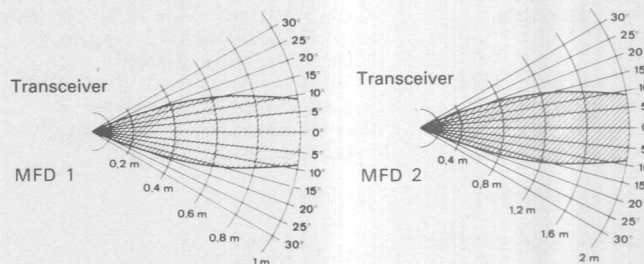
TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
With SE 110: Max. 10 Hz (Min. 50 ms).
With T-system: Max. 100 Hz (Min. 5 ms).
With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
The counters can only be used in conjunction with MFD 1.

Supply voltage: 12 VDC.

Current consumption: Lit: 15 mA.
Dark: MFD 1: 1 mA
MFD 2: 4 mA.

The shaded section indicates the location of the reflector.



PRODUCT DESCRIPTION

Transmitter and receiver (transceiver) moulded in one joint »F-enclosure«, i.e. an enclosure with rectangular cross section and with its 2 lenses placed perpendicularly on the longitudinal axis of the enclosure.

The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter section (lower lens) contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.

The receiver section (upper lens) contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along.

This feature makes the receiver insensitive to environmental light.

The figures being part of the type designation indicate the maximum distance in metres between the transceiver, and a 10 x 10 cm reflector, thus the ER 22.

In conjunction with COUNTOMATIC counters the maximum distance of the photosensors is reduced by 50 %.

All components of the transceiver are firmly embedded in a resin which makes it not only watertight (IP 67) but also insensitive to shock and vibration.

Detection in conjunction with a reflector.

The transceivers can be operated in conjunction with the ER 22 reflector at distances up to 1 or 2 metres respectively, whereby objects passing between the transceiver and the reflector are detected.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance from the transceiver to an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object.

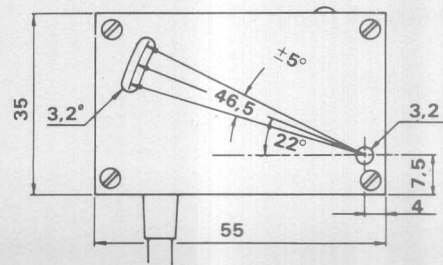
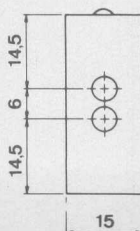
However, light reflected from an object having a plane, dead white surface, is with certainty detected at distances of 15 cm (MFD 1) and 25 cm (MFD 2) respectively.

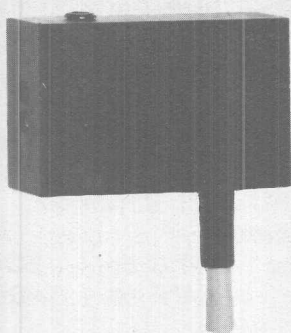
Always adjust transceivers to their maximum lit current by means of an ammeter (mA), coupled in series with the red core of the transceiver cable.

Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.

However, quick adjustment with good accuracy is also possible without an instrument. On the top edge of the transceiver a red light-emitting diode is mounted. This diode gives the brightest light when the best adjustment is achieved.

DIMENSIONS (mm)



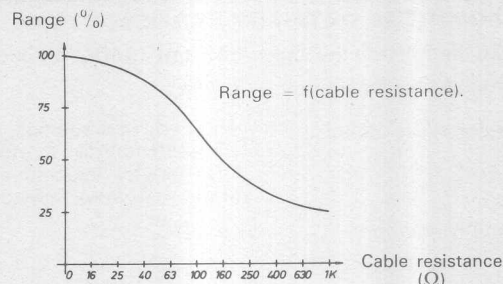


MFTR 1

- * Photosensors with infrared, modulated light.
- * Separate transmitter and receiver.
- * Operating distance: 1 metre.
- * LED-adjustment-indicator.
- * Ambient temperature: -20°C to $+60^{\circ}\text{C}$.
(-4°F to $+140^{\circ}\text{F}$).
- * Proofness: IP 67.
- * Material: Black, glassfilled ACETAL.

TECHNICAL DATA FOR TRANSMITTER

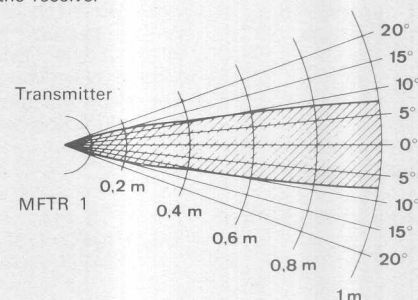
Wavelength of the light: 940 nm (9400 Å). Invisible.
 Modulation frequency: 8 KHz.
 Connection cable: Moulded, unscreened, grey PVC cable.
 Standard length: 2 metres.
 Extra length, see curve of range = f(cable resistance).
 Supply voltage: 3.5 VDC.
 Current consumption: 100 mA.



TECHNICAL DATA FOR RECEIVER

Sensing speed and duration of light/darkness: Max. 100 Hz (Min. 5 ms).
 With SE 110: Max. 10 Hz (Min. 50 ms).
 With T-system: Max. 100 Hz (Min. 5 ms).
 With COUNTOMATIC counters: Max. 10 Hz (Min. 50 ms).
 Connection cable: Moulded, unscreened, black PVC cable.
 Standard length: 2 metres.
 Can be extended if necessary, max. resistance: 100 Ω.
 Supply voltage: 12 VDC.
 Current consumption: Lit: 15 mA.
 Dark: 1 mA.

The shaded section indicates the location of the receiver



PRODUCT DESCRIPTION

Separate transmitter (MFT) and receiver (MFR) moulded in identical »F-enclosures«, i.e. enclosures with rectangular cross section and with the lens placed perpendicularly on the longitudinal axis of the enclosure. The enclosures are made of glassfilled, black ACETAL, a material with good mechanical strength and great resistance to most acids and bases.

The transmitter contains a Ga-As diode, emitting infrared light, as well as an oscillator, which modulates the light with a frequency of 8 KHz.
 The receiver contains a phototransistor and a filter which allows only light-signals with the frequency of the transmitter to pass along.
 This feature makes the receiver insensitive to environmental light.

All components of the transmitter and the receiver are firmly embedded in a resin which makes the units not only watertight (IP 67), but also insensitive to shock and vibration.

The figure being part of the type designation indicates the maximum distance in metres between transmitter and receiver, thus 1 metre. In conjunction with COUNTOMATIC counters the max. distance of the photosensors is reduced by 50 %.

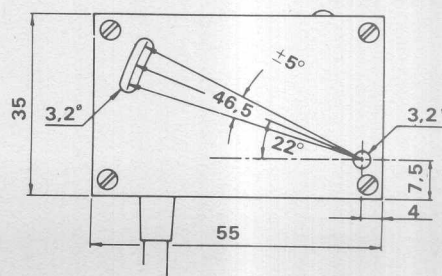
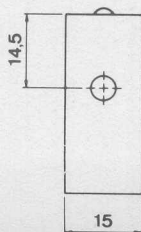
Normally the transmitter and the receiver are placed opposite to each other, so that the light beam is interrupted by any object passing between them.

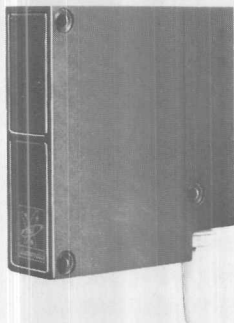
Detection in conjunction with a reflector is possible when the transmitter and the receiver are both pointing at the reflector, and objects are passing between the reflector and transmitter/receiver. The maximum distance to the reflector equals the maximum distance as indicated by the number, being part of the type designation, provided that reflector type ER 22 is used.

Detection by reflection from objects is also a possible application. In this case, the object itself must reflect the light. The distance transmitter/receiver and an object cannot be stated generally. The distance depends on the shape, colour and surface of the individual object, as well as on the angle between the transmitter and the receiver.

Always adjust photosensors to their maximum lit current by means of an ammeter (mA), coupled in series with the receiver. Proper adjustment to maximum lit current ensures trouble-free operation also under the influence of voltage fluctuations, vibrations, dust on lenses and/or reflectors as well as natural, successive decline of light intensity.
 However, to facilitate quick installation with good accuracy even without an instrument there is, on the top edge of the receiver-enclosure, mounted a red light-emitting diode. This diode gives the brightest light when the best adjustment is achieved.

DIMENSIONS (mm)





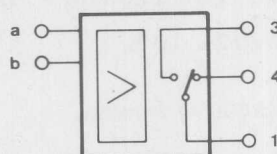
MGDM 6/6 E

- * Retro-reflective head complete with output relay or -transistor, range to reflector: 0.05 - 6 m.
- * Lenses, power supply and all other components built into a slim, watertight house (IP 67).
- * LED-indication for relay/transistor on.
- * Built-in switch for inversion of output function.
- * Infrared, modulated and synchronized light prevents disturbances from other light sources.
- * AC- or DC supply voltage.

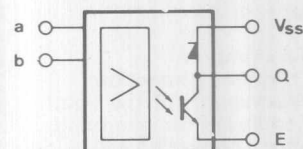
COMMON TECHNICAL DATA

Supply voltage: 12, 24, 42, 120 or 220 VAC \pm 10 %, (a + b) 50 - 60 Hz.
 12 or 24 VDC \pm 10 %.
 Consumption: 60 mA.
 Transient protection: 3 KV.
 Wavelength of the light: 940 nm (9400 Å). Invisible.
 Readiness for operation after connecting the supply voltage: Max. 1 s.
 Reset time: Min. 500 ms.
 Connection cable: Screw terminals for 5-core cable.
 Proofness: IP 67.
 Ambient temperature: - 20°C to + 60°C. (- 4°F to + 140°F).
 Material/colour, house: POLYCARBONATE, black.
 Accessories: Front mounting bezel, ball-and-socket joint mounting bracket, angle bracket, reflectors.

WIRING DIAGRAMS

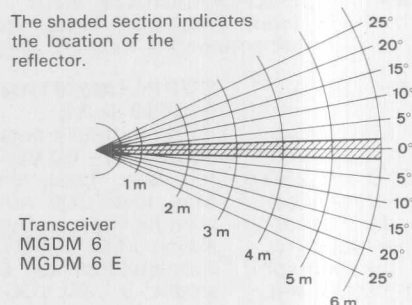


MGDM 6



MGDM 6 E

POLAR DIAGRAM



SUPPLEMENTARY DATA MGDM 6

SPDT output relay: Max. resistive load: (at AC) 5 A, 250 VAC, 1250 VA or (at DC) 0.4 A, 250 VDC, 100 W. Mechanical/electrical life: 20 x 10⁶ operations/250,000 operations at max. load. Min. duration of light/darkness: 10 ms/30 ms. Max. sensing speed: 20 Hz

SUPPLEMENTARY DATA MGDM 6 E

NPN output-transistor, open collector 5 - 40 VDC, optoisolated. Max. ripple voltage: 4 V_{pp}. Max. load: 200 mA. Transistor »conducting«: Output level »low«: Max. 1 VDC. Transistor »non-conducting«: Output level »high«: 5 - 40 VDC. Min. duration of light/darkness: 5 ms/5 ms. Max. sensing speed: 100 Hz.

PRODUCT DESCRIPTION

Combined transmitter and receiver (transceiver) for use in conjunction with reflector. With built-in power supply, amplifier, output relay or NPN output-transistor, screw terminals, LED-indication for relay/transistor on and switch for inversion of the output function. Watertight (IP 67) »G-enclosure« (see drawings) with integrated lenses. Enclosure made of self-extinguishing, black POLYCARBONATE with 3 mounting holes. Screwmounted back piece with strain relieving cable gland.

The light source is a Ga-As diode emitting infrared, modulated light in short pulses, beamed perpendicularly to the longitudinal axis of the enclosure (see drawings). A phototransistor senses if the emitted light is reflected from a reflector mounted opposite the transceiver.

Synchronization of transmitter and receiver in conjunction with a band-pass filter make these phototransceivers insensitive to surrounding light sources.

The maximum range of the photosensor depends on the size of the reflector:

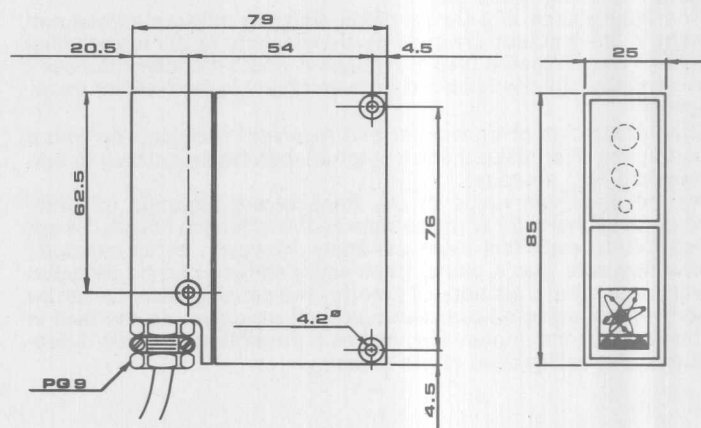
Range (m)	Reflector dimension (mm)	Reflector type
0.05-1.5	18 x 54	ER 1
0.05-2.0	Ø 32	ER 5
0.05-3.0	54 x 80	ER 2
0.05-4.0	40 x 180	ER 3
0.05-4.0	Ø 84	ER 4
0.05-6.0	100 x 100	ER 22

At detection of diminutive objects, the distance between the reflector and the transceiver should be as short as possible. If necessary the reflector can be partly covered with non-transparent tape.

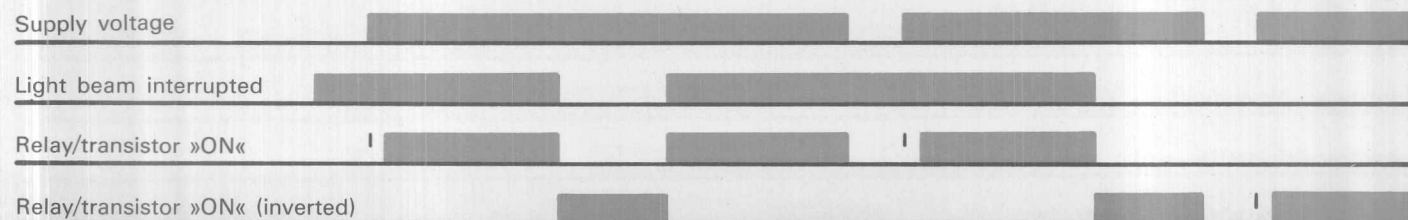
NOTE:

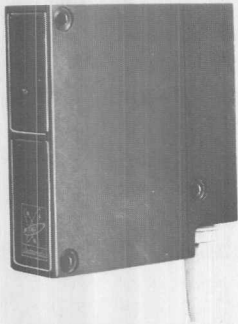
The E-version is upon special request delivered with PNP output-transistor. When ordering that variant, please add the letter P.

DIMENSIONS (mm)



OPERATION DIAGRAM





MGDM 6 A/6 AE

- * Retro-reflective head with output relay or -transistor, range to object: 0 - 1 metre (adjustable).
- * Lenses, power supply and all other components built into a slim, watertight house (IP 67).
- * LED-indication for relay/transistor on.
- * Built-in switch for inversion of output function.
- * Infrared, modulated and synchronized light prevents disturbances from other light sources.
- * AC- or DC supply voltage.

COMMON TECHNICAL DATA

Supply voltage:	12, 24, 42, 120 or 220 VAC \pm 10 %, 50 - 60 Hz.
(a + b)	12 or 24 VDC \pm 10 %.
Consumption:	60 mA.
Transient protection:	3 kV.
Wavelength of the light:	940 nm (9400 Å). Invisible.
Readiness for operation after connecting the supply voltage:	Max. 1 s.
Reset time:	Min. 500 ms.
Connection cable:	Screw terminals for 5-core cable.
Proofness:	IP 67.
Ambient temperature:	- 20°C to + 60°C. (- 4°F to + 140°F).
Material/colour, house:	POLYCARBONATE, black.
Accessories:	Front mounting bezel, ball-and-socket joint mounting bracket, angle bracket.

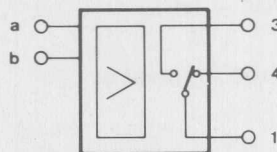
SUPPLEMENTARY DATA MGDM 6 A

SPDT output relay: Max. resistive load: (at AC) 5 A, 250 VAC, 1250 VA or (at DC) 0.4 A, 250 VDC, 100 W. Mechanical/electrical life: 20×10^5 operations/250,000 operations at max. load. Min. duration of light/darkness: 10 ms/30 ms. Max. sensing speed: 20 Hz.

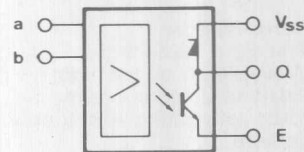
SUPPLEMENTARY DATA MGDM 6 AE

NPN output-transistor, open collector 5 - 40 VDC, optoisolated. Max. ripple voltage: 4 V_{pp}. Max. load: 200 mA. Transistor »conducting«: Output level »low«: Max. 1 VDC. Transistor »non-conducting«: Output level »high«: 5 - 40 VDC. Min. duration of light/darkness: 5 ms/5 ms. Max. sensing speed: 100 Hz.

WIRING DIAGRAMS



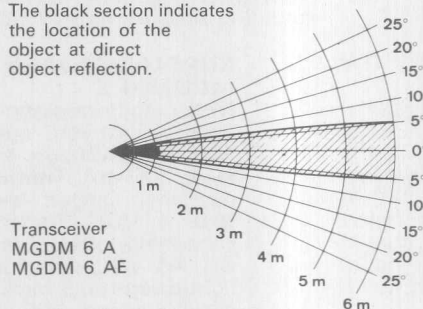
MGDM 6 A



MGDM 6 AE

POLAR DIAGRAM

The black section indicates the location of the object at direct object reflection.



PRODUCT DESCRIPTION

Combined transmitter and receiver (transceiver) for detection of objects by direct reflection. With built-in power supply, amplifier, output relay or NPN output-transistor, screw terminals, LED-indication for relay/transistor on, switch for inversion of the output function and a trimming potentiometer for adjustment of the sensing distance.

Watertight (IP 67) »G-enclosure« (see drawings) with integrated lenses. Enclosure made of self-extinguishing, black POLYCARBONATE with 3 mounting holes. Screwmounted back piece with strain relieving cable gland.

The light source is a Ga-As diode emitting infrared, modulated light in short pulses, beamed perpendicularly to the longitudinal axis of the enclosure (see drawings). A photo-transistor senses if the emitted light is reflected from an object in front of the transceiver.

Synchronization of transmitter and receiver in conjunction with a band-pass filter make these phototransceivers insensitive to surrounding light sources.

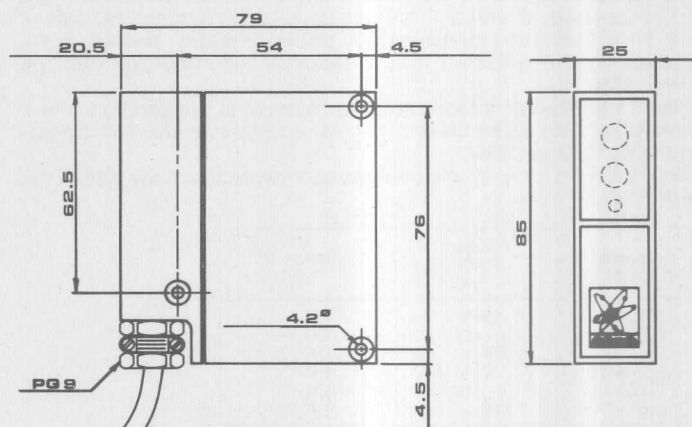
As the maximum range of the transceivers depends on form, colour and character of the surface on the reflecting object, it is not possible to state this value generally. However, as an example, you may note that a plane, dead white surface can be detected with certainty at a distance of 1 metre. The sensing distance can be screwdriver-adjusted between zero and maximum on the built-in trimming potentiometer. This makes it possible to exclude detection of the background of the object.

Detection of objects of a distinct shape is further possible by adjustment, thus excluding objects of different shape.

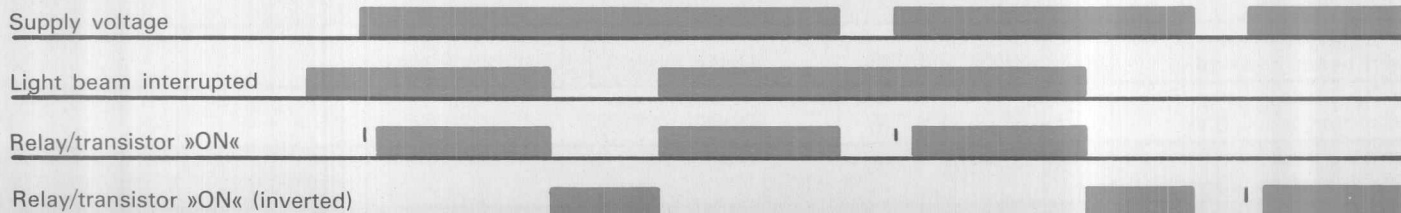
NOTE:

The E-version is upon special request delivered with PNP output transistor. When ordering that variant, please add the letter P.

DIMENSIONS (mm)

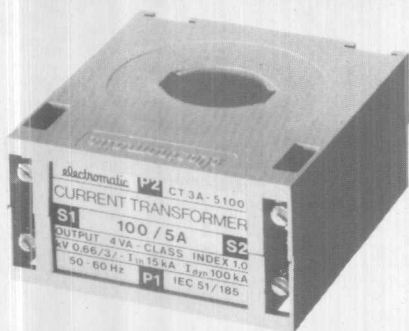


OPERATION DIAGRAM



THROUGH-PRIMARY CURRENT TRANSFORMER

CT3A



- * Through-primary current transformer.
- * 50 – 200 A primary current.
- * 1 or 5 A secondary current.
- * Can be used in conjunction with AC current metering relay, type SJ 175 and analogue panel indicator for AC metering, type SJ 073 with LED display.

SPECIFICATIONS

Primary current

50 to 200 A,
see table.

Secondary current

1 A or 5 A,
see table.

Voltage

Operating voltage:
Maximum 660 V.
Test voltage:
3 kV for one minute.

Frequency

50–60 Hz.

Overload

Maximum permissible overload:
15 kA for one second.

Excess current

Instrument security factor:
 $F_s < 5$.

Primary/secondary current, output, ordering number

Rated primary current A	Rated secondary current		Rated output VA
	1 A Ordering number	5 A Ordering number	
50	CT3A-1050	CT3A-5050	2.0
60	CT3A-1060	CT3A-5060	2.5
75	CT3A-1075	CT3A-5075	3.0
100	CT3A-1100	CT3A-5100	4.0
150	CT3A-1150	CT3A-5150	5.0
200	CT3A-1200	CT3A-5200	5.0

PRACTICAL PROGRAMME

Within the same design the CT3A transformers cover a wide range of applications.

International standards

The CT3A meets the international standards for current transformers (IEC 185-1966).
Approved for shipboard use.

Burden/Classes

The transformers cover three accuracy classes (0.5–1–3) within a maximum burden of 1.5 to 5 VA.

Ambient temperature

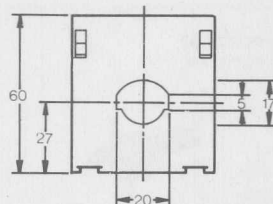
Maximum 50°C (122°F) at a maximum temperature of 90°C (194°F) of the conductor.

Enclosure

The enclosure is moisture-proof, and moulded in a heat- and impact resistant thermoplastic material being self-extinguishing.
See under Dimensions.

Dimensions (mm)

CT3A



Weight

App. 230 grams.

Terminals

The secondary terminals accommodate single-core as well as multicore conductors, and can be connected from two sides of the enclosure.

The terminals are placed within the enclosure and thus prevent inadvertent touching and short-circuiting.

Secondary conductors: Maximum 2.5 mm².

Aperture

Maximum diameter of round conductor/cable: 17 mm.

Maximum size of bar: 5 x 20 mm.

By fitting a mounting bush in the aperture (see under Mounting Accessories) a primary bar of almost unlimited width can be used.

Conductors

Each through-primary current transformer can be used with bars as well as with round conductors, the latter being turned if necessary. See under Primary Winding.

PRIMARY WINDING

Although the current transformer reproduces the primary current in the whole range from 0.1 to 1.2 times rated current, it may be necessary to provide the transformer with a primary winding in order to obtain an ample instrument deflection or ample output current from the through-primary current transformer.

Ordinary insulated wire of sufficient capacity can be employed.

Number of turns

The number of primary turns is the number of times, the wire is taken through the aperture of the transformer.

The following equation is used, when determining the number of turns:

$$\frac{\text{Rated primary current}}{\text{Required prim. current}} = \text{Number of primary turns}$$

EXAMPLE A:

Rated primary current: 100 A
Required primary current: 5 A

$$\text{Number of turns: } \frac{100 \text{ A}}{5 \text{ A}} = 20 \text{ turns.}$$

See next page!

THROUGH-PRIMARY CURRENT TRANSFORMER

ACCURACY

The measuring accuracy of a current transformer depends upon the total load in the secondary circuit.

The sum of secondary burdens (table 1 and 2) must therefore not exceed the rated output (VA) of the current transformer in the required class of accuracy (table 3).

Tables 1 and 2 may be used as guides on typical burdens, as the secondary circuit of the transformer is a current output, whereas the accuracy class can be derived from table 3.

Tables 1-3

EXAMPLE B:

When using a kWh-meter (table 2) 0.8 VA
an SJ 073 indicator (0.2-1 A) (table 2) 0.1 VA
a SJ 175 relay (0.2-1 A) (table 2) 0.1 VA
and a double copper wire of 5 metres, 1 mm² with a rated secondary current of 1 A (table 1) 0.18 VA
the total burden is 1.18 VA

If accuracy class 1 is sufficient, a transformer for a rated primary current of 75 A is selected, as the burden (1.18 VA) does not exceed 1.5 VA (table 3).

EXAMPLE C:

If the following is required:

Ratio of transformation 5/5 A,

burden 1.18 VA (from example B)

and accuracy class 0.5,

a transformer with a primary current of 100 A is selected from table 3, as the burden (1.18 VA) does not exceed 1.5 VA, and the required class is 0.5.

Now the number of turns is determined using the equation stated under Primary Winding:

$$\frac{100 \text{ A}}{5 \text{ A}} = 20 \text{ turns.}$$

Transformer/instruments

When using kWh-meters/measuring instruments in class 0.5 or 1, a transformer in class 0.5 is required.

If kWh-meters/measuring instruments in class 1.5 or 2.5 are employed, a transformer in class 1 is required.

Instruments and meters in class 3 to 5 require class 3 of the transformer.

Table 1

Burden of conductor

Rated secondary current	Double wire	0.5 m	1.0 m	2.5 m	5 m	10 m
	Conductor area	Burden of copper wire (VA)				
1 A	1 mm ²	0.018	0.035	0.09	0.18	0.35
	1.5 mm ²	0.012	0.023	0.06	0.12	0.23
5 A	1.5 mm ²	0.29	0.58	1.45	2.9	5.8
	2.5 mm ²	0.18	0.35	0.88	1.75	3.5

Table 2

Burden of connected instruments etc.

Type of burden	VA
Moving-iron instrument	0.3-1.2
Moving-coil instrument	0.3-1.2
Bimetal instrument	2.0-3.2
kWh-meter	0.8
Relay/indicator type SJ 175/SJ 073 (0.2-1 A)	0.1
Relay/indicator type SJ 175/SJ 073 (1-5 A)	0.5

Table 3

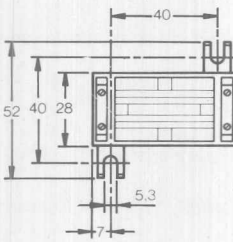
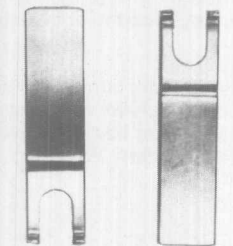
Accuracy/Burden

Class	0.5	1	3
Rated primary current (A)	Rated output (VA)		
50	—	—	2
75	—	1.5	3
100	1.5	3	4
150	2.5	5	5
200	2.5	5	5

MOUNTING ACCESSORIES & DIMENSIONS (mm)

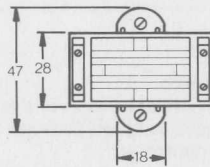
FITTINGS TYPE CTA-01

For wall mounting
(2 per pack).
5 grams.



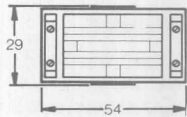
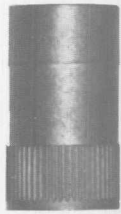
CLAMP TYPE CTA-02

For mounting on bars.
10 grams.



BUSH TYPE CTA-03

To be placed in the
aperture for mounting
between two bars or be-
tween bar and cable lug.
Inner diameter 11 mm,
for 10 mm steel bolt.
40 grams.

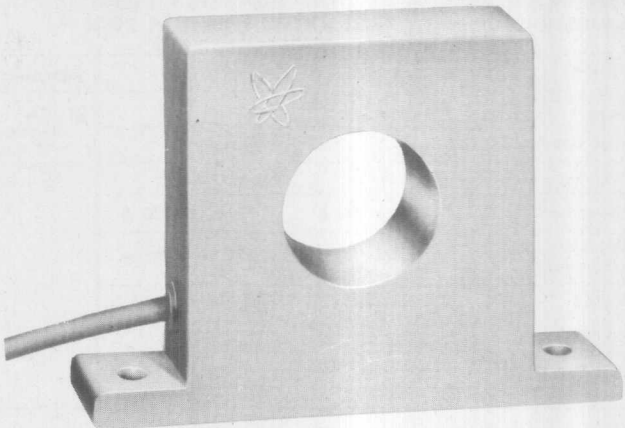


CURRENT METERING TRANSFORMERS

Single-phase current metering transformers for use in conjunction with S-SYSTEM type SM 115 - SG 195

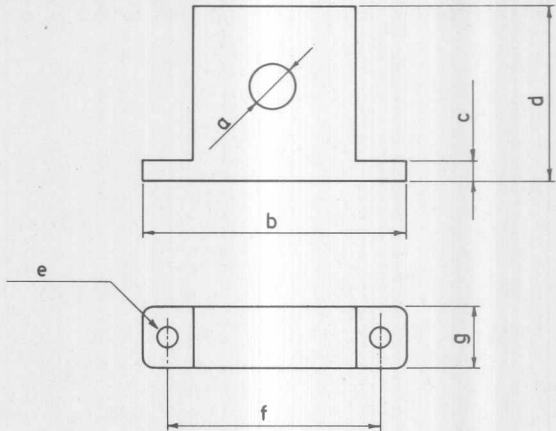
TYPE	MI 5	MI 20	MI 100	MI 500
Current range in conjunction with SM 115	0.5-5 A _{rms}	2-20 A _{rms}	10-100 A _{rms}	50-500 A _{rms}
Voltage output in conjunction with SM 115	0.1-4 V _{peak}	0.1-4 V _{peak}	0.1-4 V _{peak}	0.1-4 V _{peak}
Max. current	20 A	50 A	250 A	700 A
R _{out}	700 Ω	200 Ω	40 Ω	10 Ω
Power loss	< 100 mW/5 A	< 100 mW/20 A	< 0.5 W/100 A	< 6 W/500 A
Ambient temp.	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C
Weight	70 grammes	70 grammes	270 grammes	270 grammes
Moulded connection cord	1 metre	1 metre	2 metres	2 metres
Material	ABS	ABS	ABS	ABS

The voltage output is proportional with the current flowing in a conductor drawn through the central hole of the current metering transformer. It is possible to use the current metering transformers, for instance the MI 5, for measurements far below the nominal range by drawing the conductor more times - for instance 5 - through the central hole, resulting in the range 0.1-1.0 A_{rms}.



MI 5 - MI 20
MI 100 - MI 500
JD 20
JD 100
JD 500

DIMENSIONAL DRAWINGS



DC current metering transformers For use in conjunction with S-SYSTEM type SJ 125

Parameters / Type	JD 20	JD 100	JD 500
Current range nominal 1)	2 - 20 A	10 - 100 A	50 - 500 A
Max. current (continuously at + 20°C)	22 A	110 A	550 A
Max. current (duration 5 s)	40 A	200 A	700 A
Ambient temperature	0 to + 40°C	- 20 to + 60°C	- 20 to + 60°C
Supply voltage (supplied from SJ 125)	12-24 VDC { + 15 % - 10 %	12-24 VDC { + 15 % - 10 %	12-24 VDC { + 15 % - 10 %
Current consumption (typ.)	25 mADC	25 mADC	25 mADC
Current output	0 - 20 mADC	0 - 20 mADC	0 - 20 mADC
Tolerance of current output (typ.)	5 %	5 %	5 %
Temperature influence (related to + 20°C), typ.	± 0.1 %/°C	± 0.1 %/°C	± 0.1 %/°C
Moulded connection cable, grey, 3 x 0.14 mm ² , 4 mm Ø	2 m	2 m	2 m
Material/colour, housing	ABS/Blue	ABS/Blue	ABS/Blue
Weight in grams (approx.)	300	300	300

Type	a	b	c	d	e	f	g
MI 5 MI 20	12	53	4	36	4,5	42,5	13
MI 100 MI 500							
JD 20 JD 100 JD 500	27	95	7	68	5	78	20

1) The conductor on which you meter is drawn through the central hole of the current metering transformer. It is possible to meter currents below the nominal range by drawing the conductor through the hole more times. If the conductor is drawn through the central hole for instance 5 times, the metering transformer will register 5 A when the current in the conductor is 1 A. In any case, the direction of the current must match the direction indicated by an arrow on the current metering transformer which is connected to the S-system as shown on the catalogue sheet concerning SJ 125.

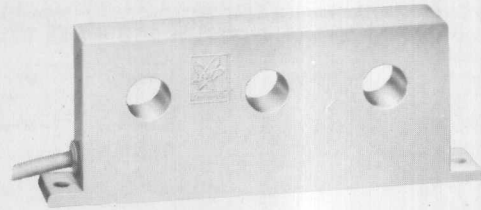
CURRENT METERING TRANSFORMERS

3-phase current metering transformers for use in conjunction with S-SYSTEM type SM 190:

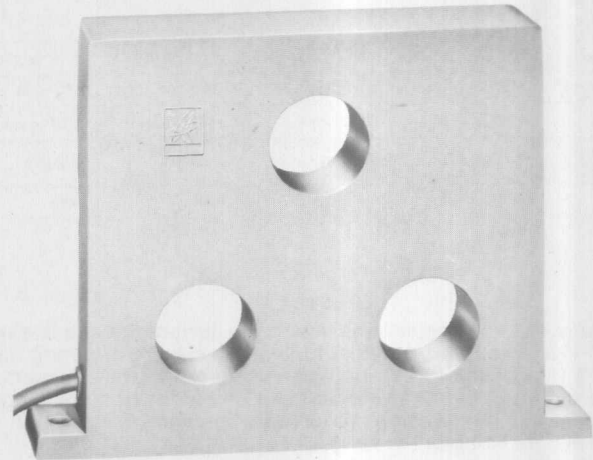
TYPE	MI 3050	MI 3500	REMARKS
Current metering range	1-50 A	1-500 A	* Max. ambient temperature for currents below 200 A is + 60°C.
Max. current	50 A	500 A	
Frequency	50-60 Hz	50-60 Hz	
Power loss	< 1 W at 50 A	< 17 W at 500 A	
Ambient temperature	-20°C to +60°C	-20°C to +40°C*	
Weight	200 grammes	750 grammes	
Moulded connection cable	1 metre	2 metres	
Material	ABS	ABS	

The current metering transformers MI 3050 and MI 3500 are connected to the SM 190 S-SYSTEM with the RED core to pin 5, the YELLOW to pin 6 and the BLACK to pin 7.

The lines of the 50/60 Hz, 3-phase source, which must be supervised for BREAKING OF PHASE, are drawn through the 3 holes of the current metering transformer from the same side of the transformer and in correct phase sequence, and then connected to the load. If the current consumption of the load is less than 1 A in any of the 3 phases, it is still possible to use the MI 3050 and MI 3500 current metering transformers by drawing the power lines more than once through the holes of the transformers: 5 times through, for instance, will reduce the lower operating limit to 0.2 A, equaling 1.0 : 5.

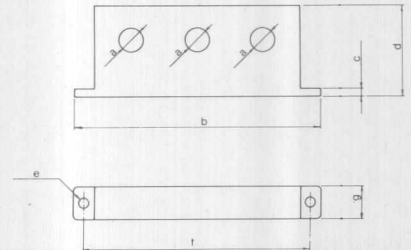


MI 3050
MP 3005
MP 3020



MI 3500
MP 3100
MP 3500

DIMENSIONAL DRAWINGS

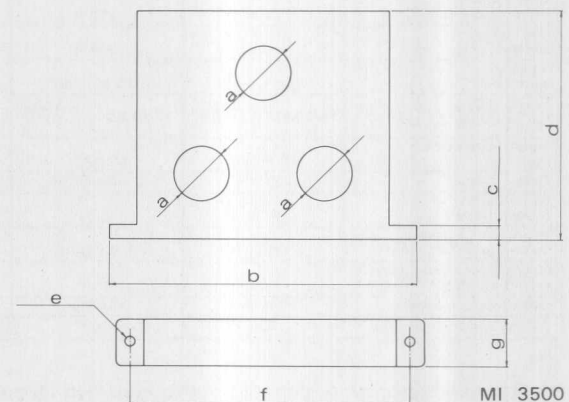


MI 3050
MP 3005
MP 3020

3-phase current metering transformers for use in conjunction with S-SYSTEM type SM 115:

TYPE	MP 3005	MP 3020	MP 3100	MP 3500
Current range in conjunction with SM 115	0.5-5 A _{rms}	2-20 A _{rms}	10-100 A _{rms}	100-500 A _{rms}
Voltage output in conjunction with SM 115	0.1-4 V _{peak}	0.1-4 V _{peak}	0.1-4 V _{peak}	0.1-4 V _{peak}
Max. current	20 A	50 A	150 A	500 A
Power loss	< 300 mW/5 A	< 300 mW/20 A	< 2 W/100 A	< 21 W/500 A
Ambient temperature	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C	-20°C to +40°C*
Weight	200 grammes	200 grammes	750 grammes	750 grammes
Moulded connection cable	1 metre	1 metre	2 metres	2 metres
Material	ABS	ABS	ABS	ABS

REMARKS: *Max. ambient temperature for currents below 200 A is + 60°C.

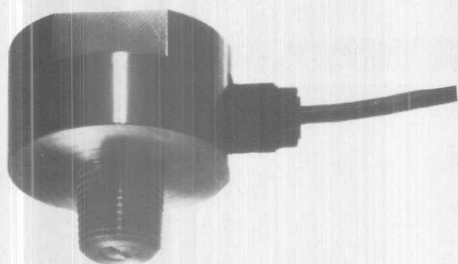


MI 3500
MP 3100
MP 3500

The voltage output is proportional with the greatest current in the 3 conductors which are drawn through the holes of the current metering transformer. By drawing each conductor several times through the hole, the voltage output is multiplied by the same number of times as each conductor is drawn through the hole. This makes it possible to use the current metering transformers, f.inst. the transformer type MP 3005, for measurements far below the nominal range.

TYPE	a	b	c	d	e	f	g
MI 3050 MP 3005 MP 3020	12	120	4	45	4	109	16
MI 3500 MP 3100 MP 3500	26	150	7	113	5	137	23

PRESSURE TRANSDUCERS



JP 05/JP 15/JP 30

- * Solid state pressure transducers for non-corrosive gases and liquids.
- * Pressure range 0-30 psi (0-2.0 bar) in three sub-ranges.
- * Output signal in all ranges: 0-20 mA.
- * Supply voltage: 11-27 VDC (normally supplied by the SJ 125 S-system).

SPECIFICATIONS

Measuring ranges

JP 05: 0- 5 psi/0-0.3 bar.
JP 15: 0-15 psi/0-1.0 bar.
JP 30: 0-30 psi/0-2.0 bar.

Hysteresis

In conjunction with S-system type SJ 125, the hysteresis is app. 10%.

Maximum permissible excess pressure at 20°C

10% continuously, 50% for 5 seconds. The transducers should not be exposed to vacuum.

Ambient temperature

-20° to +60°C
(-4°F to +140°F).

Temperature conditions

Error in measurement in relation to change of temperature, point of origin +20°C (+68°F):
Typ. $\pm 0.2\%$ per °C.

Supply voltage

11-27 VDC, normally supplied by the SJ 125.

Current consumption

25 mA typically.

Output current

0-20 mA.

Typical tolerance on output current

3%.

Electric connection

Fixed PVC cable, grey.
3 \times 0.40 mm², \varnothing 4.5 mm, length 2 m.
See wiring diagrams below.

Mechanical connection

Conical 1/2" pipe thread.

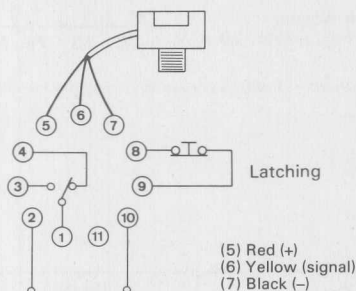
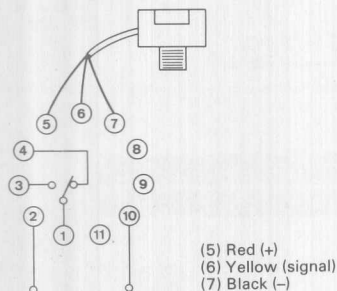
Material/colour, housing

Aluminium, natural anodized.
(Other materials upon request.)

Weight

App. 285 grams.

WIRING DIAGRAMS



MODE OF OPERATION

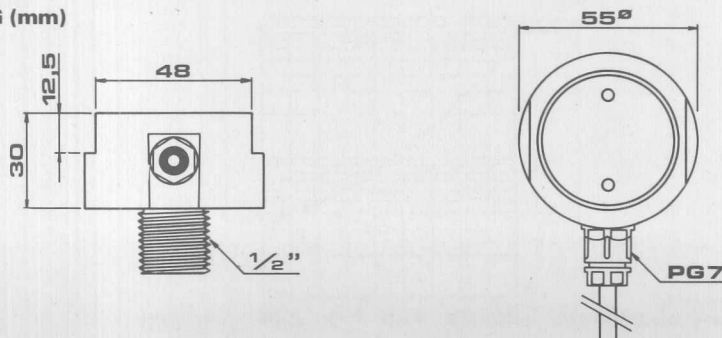
The transducer contains an operational amplifier coupled with a measuring bridge, implanted in a TEFLON diaphragm.

At equal pressure on both sides of the diaphragm the bridge is in balance and the output signal zero. At increasing pressure against the front side of the diaphragm, the output current increases lineally, being 20 mA (DC) at 5 psi (5, 15 or 30 psi depending on type of transducer).

When a JP-transducer is used in conjunction with a SJ 125 S-system, the hysteresis is app. 10%. By means of external 0.25 W resistor connected between pins 8 and 9, the hysteresis can be increased up to app. 75%. Resistor limits are 220 K Ω /10 K Ω . Decreasing ohmic value results in increasing hysteresis.

When a switch (NC) is connected across pins 8 and 9 of the SJ 125 S-system, the relay shall latch when energized at set value (mA-equivalent) and remain energized until the switch is opened or the S-system supply voltage is interrupted.

DIMENSIONAL DRAWING (mm)



TEMPERATURE SENSORS

TEMPERATURE SENSORS FOR RELAYS SE 125, SE 135 OR SE 155.

ETS 1 ETS 11: Bronzed brass sensor.
ETS 12: White PTFE sensor (Teflon sensor).
Temperature range: -25°C to $+150^{\circ}\text{C}$.
Field of application: For liquids.

TECHNICAL DATA

Thermal time constant

	Cooling in air		Heating in water	
	Without ETO pipe	With ETO pipe	Without ETO pipe	With ETO pipe
ETS 11	3 mins.	7 mins.	20 secs.	26 secs.
ETS 12	2 mins.	6 mins.	30 secs.	36 secs.

Sensor type:

R 25°C :

Temperature rise:

Max. power:

Connection cable:

Accessories:

NTC resistor.

$15\text{ K}\Omega \pm 20\%$.

$0.2^{\circ}\text{C}/\text{mW}$. Max. load: 0.6 W at 25°C .

20 mW throughout the whole temperature range.

Unscreened cable.

Standard length: 1 metre, $2 \times 0.75\text{ mm}^2$.

Diameter: $\varnothing 6\text{ mm}$

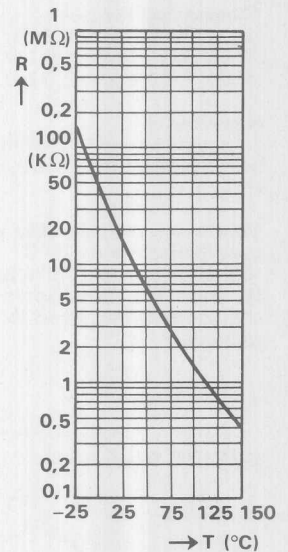
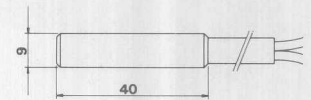
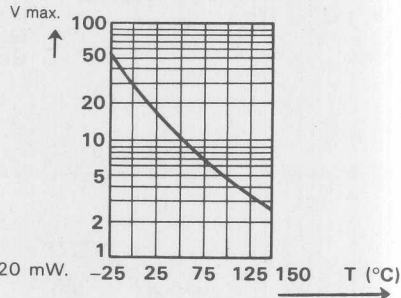
Temperature: Max. 170°C .

Mounting pipe type ETO of brass can be used

in conjunction with the ETS sensor.

Silicone paste can with advantage be used for improvement of the thermal conduction between sensor and pipe.

Permissible working range by max. power: 20 mW.



ETS 2 ETS 21: Bronzed brass sensor.
ETS 22: White PTFE sensor.
Temperature range: $+100^{\circ}\text{C}$ to $+250^{\circ}\text{C}$.
Field of application: For liquids.

TECHNICAL DATA

Thermal time constant

	Cooling in air		Heating in water	
	Without ETO pipe	With ETO pipe	Without ETO pipe	With ETO pipe
ETS 21	4 mins.	8 mins.	15 secs.	25 secs.
ETS 22	3 mins.	7 mins.	35 secs.	45 secs.

Sensor type:

R 100°C :

Temperature rise:

Max. power:

Connection cable:

Accessories:

NTC resistor.

$30\text{ K}\Omega \pm 20\%$.

$0.5^{\circ}\text{C}/\text{mW}$. Max. load: 0.3 W at 25°C .

10 mW throughout the whole temperature range.

Unscreened Teflon cable.

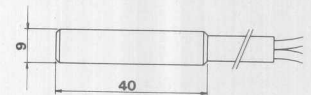
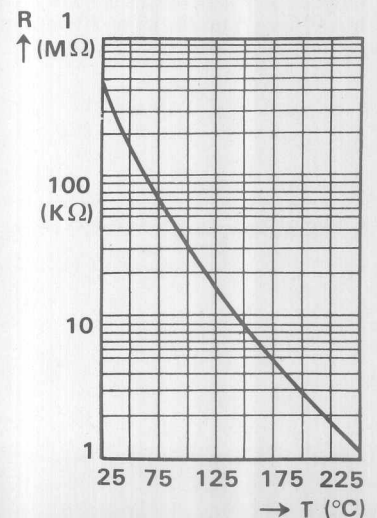
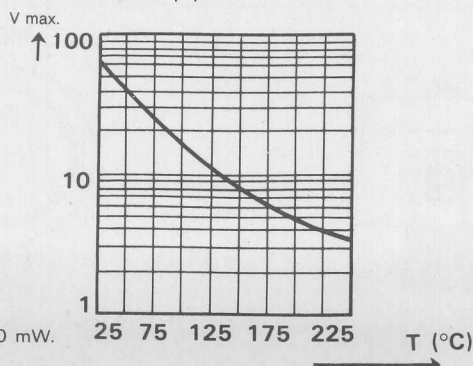
Standard length: 0.5 metre, $2 \times 0.6\text{ mm}^2$.

Diameter: $\varnothing 3.6\text{ mm}$.

Mounting pipe type ETO of brass can be used in conjunction with the ETS sensors.

Silicone paste can with advantage be used for improvement of the thermal conduction between sensor and the ETO pipe.

Permissible working range by max. power: 10 mW.

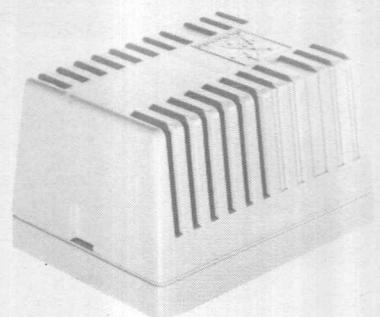


TEMPERATURE SENSORS

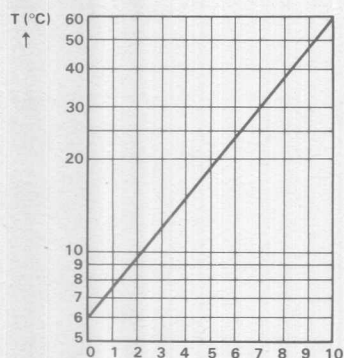
ETS 3 ETS 3: Housing made of NORYL SE 1, light grey.
Temperature range: +5 to +60°C (41 to 140°F).
For metering the temperature of air.

TECHNICAL DATA

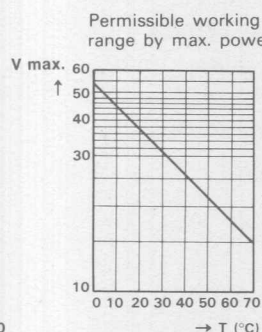
Sensor type: NTC resistor.
Thermal time constant: 6 min. $\pm 10\%$.
R 25°C: 47 K $\Omega \pm 20\%$ (5 % and 10 % tolerance on order).
Temperature rise: 0.2°C/mW. Max. power 0.6 W at 25°C.
Max. power: 20 mW throughout the whole temperature range.
Reference resistance/potentiometer: 100 K Ω potentiometer (10 K Ω min. resistance). Other reference resistors/potentiometers are available on request.
Scale adjustment: Also available less reference potentiometer. Adjustment from 1-10. Belonging curve can be used in conjunction with S-Systems SE 125, SE 135 and SE 155. The accuracy of the curve is determined by the accuracy of the sensor. (See R 25°C).
Mounting: For mounting on walls, ceilings, etc. by means of 2 screwholes in the base.



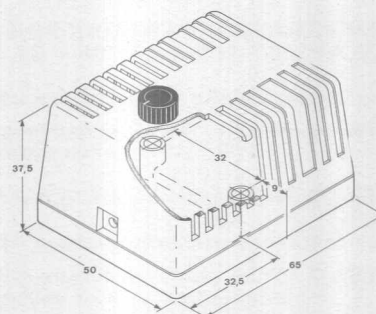
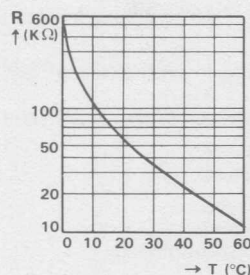
ETS 3 has a built-in potentiometer (see drawing below).



→ Scale adjust.



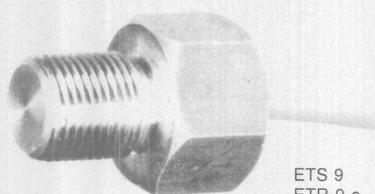
Permissible working range by max. power: 20 mW.



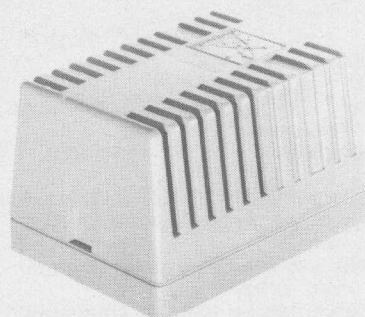
TEMPERATURE SENSORS



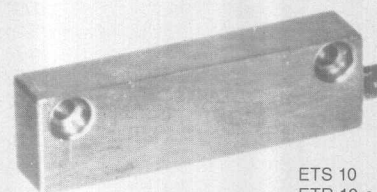
ETS 6
ETR 6 a



ETS 9
ETR 9 a



ETS 7
ETR 7 a
ETS 8 (knob-adjustable)



ETS 10
ETR 10 a

TEMPERATURE SENSORS FOR AMPLIFIER ST 040 AND RELAYS ST 100 - ST 105 - ST 145 - ST 175

For metering the temperature of liquids (metering range: - 20 to + 120°C).

ETS 6 ETS 61: Nickel-plated brass sensor } Fit into screw-in pipe type ETO*.
ETS 62: White teflon sensor }

ETS 9 Nickel-plated brass sensor for screwing in with external 3/8" pipe thread.

For metering the temperature of air (metering range: - 20 to + 60°C).

ETS 7 White plastic enclosure with black base.
Mounted on wall or ceiling by 2 screws.

ETS 8 White plastic enclosure with black base.
Mounted on wall or ceiling by 2 screws.
Temperature adjustable by built-in potentiometer.

For metering surface temperature (metering range: - 20 to + 120°C).

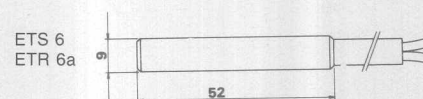
ETS 10 Nickel-plated brass enclosure.
Attached to plane metallic surfaces by 2 screws*).

SPECIFICATIONS

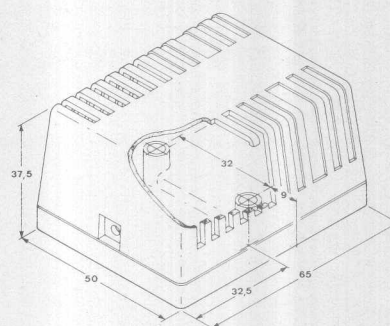
Sensor type:	Semi-conductor sensor.
Tolerance:	Typ. 1°C.
Power loss in sensor:	0.7 mW.
Voltage change:	2.16 mV/°C.
Thermal time constant:	ETS 6 and 9: 12 sec. ETS 7 and 8: Still air: 14 min. Air flow: 1 min.
Connection cable:	ETS 10: Max. 1 min. (Does not apply to ETS 7 and ETS 8.) Silicone cable, grey, unscreened, heat-resistant to 250°C. 3-core, 3 x 0.25 mm ² , Ø 5.2 mm. Standard length: 1 metre. If extension necessary: See table of error in indication.
Terminal block:	(Applies to ETS 7 and ETS 8 only). 2-pole.
Accessories:	(Apply to ETS 61 and ETS 62 only.) Screw-in pipe, type ETO.

*) For improvement of the heat conduction between the ETS 6 - sensors and the ETO - pipe, as well as between the ETS 10 - sensor and a metallic surface, silicone paste should be used.

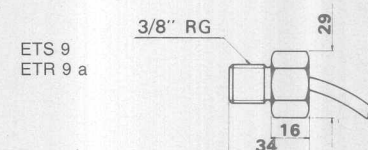
DIMENSIONAL DRAWINGS



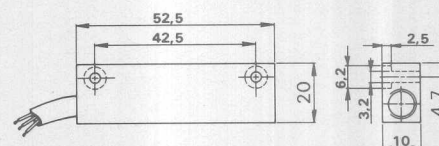
ETS 6
ETR 6 a



ETS 7
ETR 7 a
ETS 8 (knob-adjustable)



ETS 9
ETR 9 a



ETS 10
ETR 10 a

DIAGRAM OF INDICATION ERROR = F(CABLE LENGTH/SECTIONAL AREA) BY APPLICATION OF TEMPERATURE SENSORS ETS 6 - ETS 7 - ETS 8 - ETS 9 - AND ETS 10.

Cable length	Cross-sectional area					
	□ 0.75 mm ²		□ 1 mm ²		□ 1.5 mm ²	
	Ω	Error	Ω	Error	Ω	Error
10 metres	0.23	-0.1°C	0.17	0	0.11	0
25 metres	0.57	-0.3°C	0.43	-0.2°C	0.29	0.15°C
50 metres	1.15	-0.6°C	0.86	-0.4°C	0.57	-0.3 °C
100 metres	2.3	-1.2°C	1.72	-0.8°C	1.1	-0.6 °C

TEMPERATURE SENSORS

TEMPERATURE SENSORS FOR AMPLIFIER ST 010 AND RELAYS ST 115 – ST 119 – ST 185

For metering the temperature of liquids (metering range: -20 to +120°C).

ETR 6 a ETR 6.1 a: Nickel-plated brass sensor } Fit into screw-in pipe type ETO*).

ETR 6.2 a: White teflon sensor

ETR 9 a Nickel-plated brass sensor for screwing in with external 3/8" pipe thread.

For metering the temperature of air (metering range: -20 to +60°C).

ETR 7 a White plastic enclosure with black base.
Mounted on wall or ceiling by 2 screws.

For metering surface temperature (metering range: -20 to +120°C).

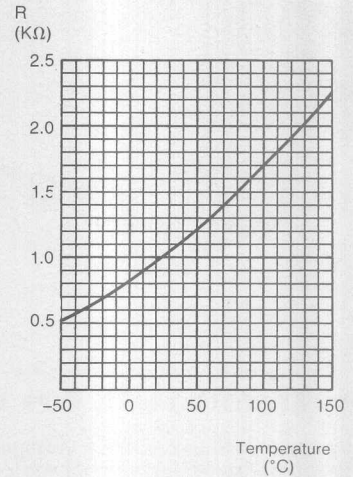
ETR 10a: Nickel-plated brass enclosure.
Attached to plane metallic surfaces by 2 screws*).

SPECIFICATIONS

Sensor type:	PTC resistance sensor.
Tolerance:	Typ. 1.5°C at 25°C and 2°C at 100°C.
Power loss in sensor:	0.3 mW.
Change of resistance:	0.75%/°C, $R = 817 \Omega/0^\circ\text{C}$.
Thermal time constant:	ETR 6 a and 9 a: 12 sec. ETR 10 a: Max. 1 min. ETR 7 a: Still air: 14 min. Air flow: 1 min.
Connection cable:	(Does not apply to ETR 7 a.) Silicone cable, grey, unscreened, heat-resistant to 250°C. 2-core, $2 \times 0.38 \text{ mm}^2$, $\varnothing 5.2 \text{ mm}$. Standard length: 1 metre. (Apply to ETR 7 a only.)
Terminal block:	2-pole.
Accessories:	(Apply to ETR 6.1 a and ETR 6.2 a only.) Screw-in pipe, type ETO.
Mechanical design:	As ETS-sensors with the same number.
Dimensions:	As ETS-sensors with the same number.

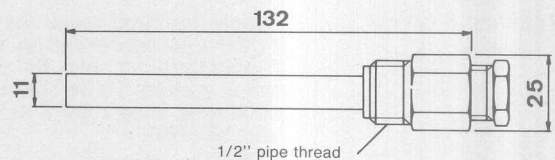
*) For improvement of the heat conduction between the ETR 6 a – sensors and the ETO-pipe, as well as between the ETR 10 a – sensor and a metallic surface, silicone paste should be used.

Resistance as function of temperature



ETO Screw-in pipe for temperature sensors
ETR 6, ETS 1, ETS 2, and ETS 6.

Material: Brass.
Temperature: Max. 300°C.
Pressure: Max. 50 atm.
Thread: 1/2" pipe thread, external.



INSTRUMENTS

Moving-coil instruments for indication of the temperature by use of amplifiers and relays.
See the individual catalogue pages.

TECHNICAL DATA

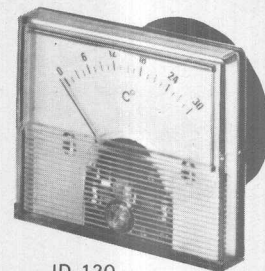
Full scale deflection: 1 mA
Internal resistance: Type ID 120: 110 Ω
Types ID 270-IDM 270: 300 Ω

Mechanical dimensions: Type ID 120

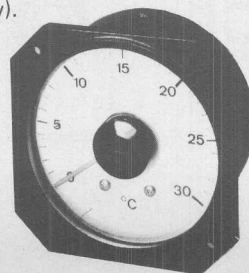
Front frame: 42x48 mm (h x w).
Panel output: $\varnothing 38 \text{ mm}$.
Mounting depth: 33 mm.

Types ID 270-IDM 270

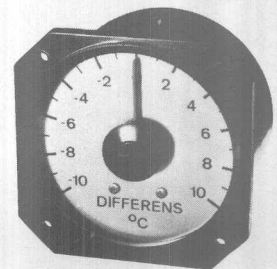
Front frame: 83x83 mm.
Panel output: $\varnothing 80 \text{ mm}$.
Mounting depth: 55 mm.



ID 120



ID 270



IDM 270

COMPENSATING LINK FOR THERMOCOUPLE SENSORS

COMPENSATING LINK TYPE ETC 1

For use in conjunction with the S-system type ST 155 and ST 165



COMPENSATING LINK TYPE ETC 1

A thermocouple generates a voltage proportional to the difference of temperature between its »hot« end (the metering point) and its »cold« end (the reference point).

Knowledge of the temperature at the reference point is thus required in order to find the actual temperature at the metering point.

Therefore a compensating link, type ETC 1, is employed as reference point. The ETC 1 is fitted with the necessary screwterminals for the leads of the thermocouple and the connection cable to the S-system. The ETC 1 further contains a PTC sensor the re-

sistance of which is a term of the temperature at the reference point.

Addition of the temperature at the reference point and the differential temperature between the »hot« and the »cold« end of the thermocouple takes place in the S-system thus registering the true temperature at the metering point, i.e. the thermocouple junction.

If the leads of the thermocouple must be extended compensating cable should be employed. Common copper cable is used between the compensating link and the S-system.

SPECIFICATIONS

Material/colour, housing: Knockproof, synthetic material.
Under part dark grey.
Upper part light grey.

Cable entries: 2 PG 7 cable glands.

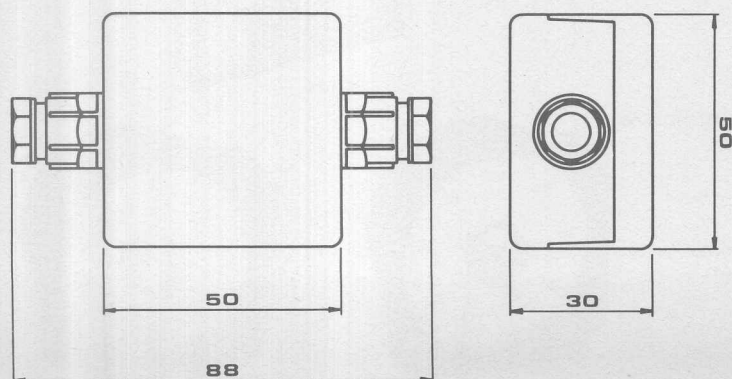
Terminal blocks: 2-pole terminal block for thermocouple.
Positive is connected to terminal 2.
4-pole terminal block for connection cable to the S-system. To be connected as shown on catalogue sheets for S-system, type ST 155 and ST 165.

Ambient temperature: - 20 to + 60°C.

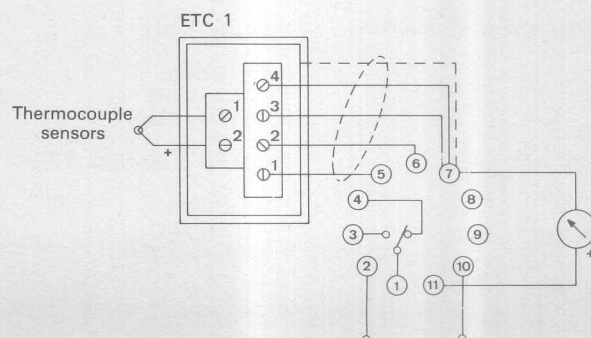
Tolerance for reference sensor (PTC): 1.5°C at 25°C.

Power loss in reference sensor (PTC): 0.3 mW.

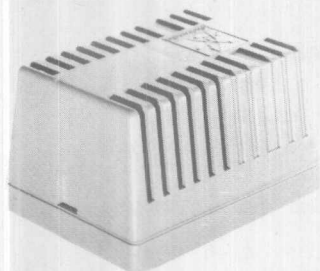
DIMENSIONS (mm)



CONNECTION: ETC 1/ST 155, ST 165



GAS DETECTORS



HG 10/HG 20

- * Gas detectors.
- * HG 10: High sensitivity to propane, butane and methane.
- * HG 20: High sensitivity to toxic gases and smoke.
- * For use in conjunction with S-system, type SH 115.
- * Supply voltage: 5 VDC.
- Normally supplied by SH 115.

TECHNICAL DATA

Supply voltage

Supplied from S-system, type SH 115:
5 VDC (stabilized).

Ambient temperature

HG 10 and HG 20 incorporate temperature compensation, and the sensitivity is only slightly altered within the temperature range:
-10 to +35°C (14 to 95°F).

Gas concentration

Required gas concentration:
Minimum 500 ppm (=0.05%).

Humidity

The characteristics of the detectors change slightly within the range:
30 to 100% relative humidity.

Connection to SH 115

Terminal 1 to pin 5 (+).

Terminal 2 to pin 6.

Terminal 3 to pin 7 (-).

Maximum length of 0.75 mm² connection cable: 50 metres.

Mounting

HG 10 and HG 20 can be mounted on ceiling, wall or floor with two screws.

The specific gravity of the gas to be detected is important when deciding the right mounting place.

The detectors should not be exposed to draught.

Housing

Material: NORYL SE 1.

Colour: Grey.

DESCRIPTION

The gas detectors, type HG 10/HG 20 are used in conjunction with S-system, type SH 115.

The detectors are supplied with 5 VDC (stabilized) from the S-system.
See under SH 115 for further details.

HG 10:

HG 10 is very sensitive to propane, butane, isobutane, ethanol, methane (natural gas), and hydrogen.

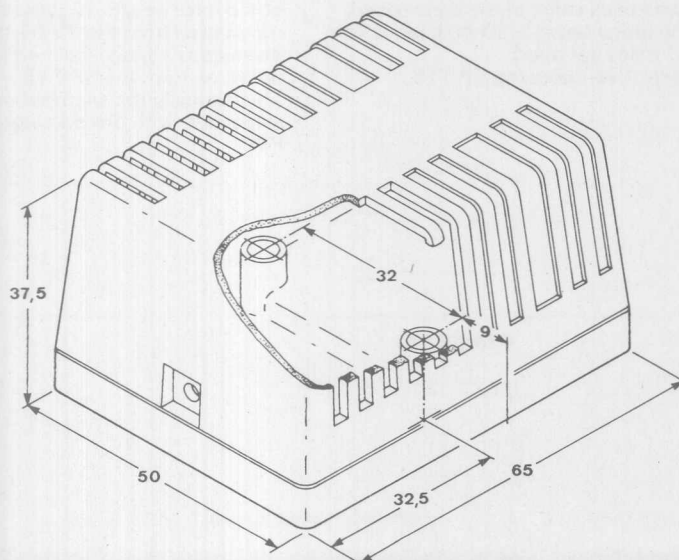
At the same time it is rather insensitive to e.g. alcohol and carbon monoxide, and it is thus suitable for giving alarm when required, while »noise gases« do not trigger false alarms.

HG 20:

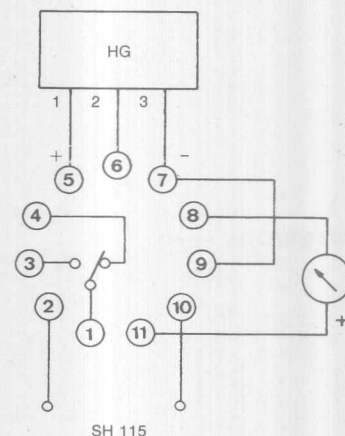
HG 20 is very sensitive to toxic gases (e.g. carbon monoxide, ammonia, sulphur dioxide) and organic solvent vapours (e.g. alcohol, benzene).

This detector is suitable for smoke alarm.

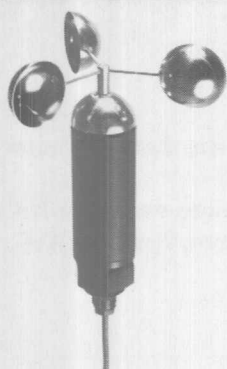
DIMENSIONS (mm)



CONNECTION DIAGRAM



WIND METERING



PV 01

- * Opto-electronic anemometer.
- * Measuring range:
2-30 metres/second (5-67 miles/hour).
- * Pulse generator for wind velocity relay, type SP 115.
- * Rotor consists of hemispherical stainless steel cups.
- * Supply voltage 11-27 VDC.
Normally supplied from the S-system.

TECHNICAL DATA

Measuring range
2-30 m/s.

Supply voltage
11-27 VDC.
Normally delivered from the S-system.

Consumption
Typically 20 mA.

Resolution
10 pulses per revolution.

Signal output
Open collector, maximum load:
2 mA - 30 VDC.

Connection cable
Unscreened, black PVC-cable:
2 m, 3 x 0,40 mm², Ø 4,5 mm.
Can be extended if required.

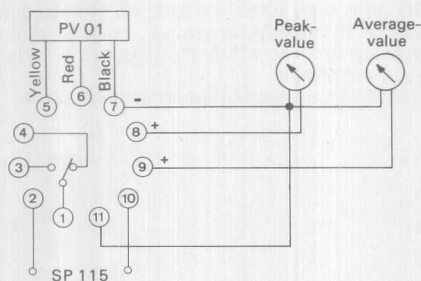
Ambient temperature
- 20°C to + 50°C.
(- 4°F to + 122°F.)

Materials/colour
Housing: Black PVC.
Rotor: 3 electro-polished,
hemispherical cups.
Stainless steel
(AISI 303).
Bearings: Ball bearings.

Thread
External thread:
M 28 x 2.
With one nut.

Weight
App. 320 grams.

WIRING DIAGRAM



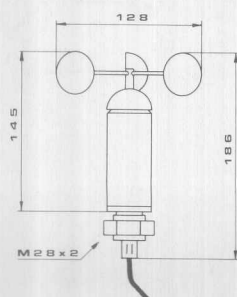
MODE OF OPERATION

In conjunction with wind velocity relay, type SP 115 the anemometer, type PV 01 can be used for avoidance of commuting and overloading of wind-driven generators (windmills).

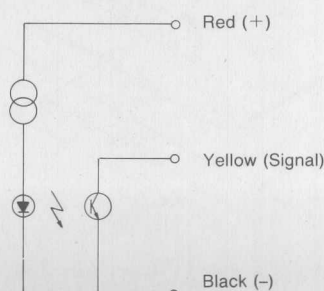
When connecting two moving-coil instruments to the SP 115, the system can be used for the remote display of both average and peak value of the wind speed; measuring range being 2-30 m/s (equalling app. 5-67 miles per hour).
Further data: See under the SP 115.

The anemometer contains a Ga-As diode, a photo-transistor with open collector, and a coded disc with 10 pitches. Each revolution of the rotor equals 10 pulses, which are transferred from the PV 01 to the SP 115. The supply voltage for the PV 01 is normally delivered from the SP 115. Mechanically the anemometer consists of a rotor shaft with ball bearings, and a house in PVC.

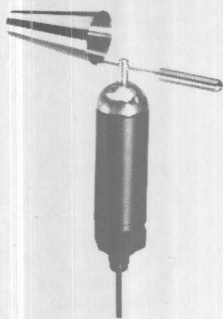
DIMENSIONS (mm)



DIAGRAM



WIND METERING



OD 02

- * Opto-electronic wind vane for relative wind direction.
- * Signal for change of wind $> 7^\circ$ and direction of change (left/right).
- * Signal generator for wind direction relay, type SO 115.
- * Supply voltage 11-27 VDC.
Normally supplied from the S-system.

TECHNICAL DATA

Supply voltage

11-27 VDC.
Normally delivered from the S-system.

Power consumption

Typically 20 mA.

Control range

$\pm 7^\circ$.

Hysteresis

3.5° .

Signal outputs

Open collector outputs,
maximum load:
2 mA - 30 VDC.

Connection cable

Unscreened, black PVC cable:
2 m, $4 \times 0.40 \text{ mm}^2$, $\varnothing 4.9 \text{ mm}$.
Can be extended if required.
Strain relieved.

Mounting

OD 02 is mounted on the top of the windmill with the marking dot on the housing of OD 02 pointing forward (perpendicularly to the wings).

Ambient temperature

-20° to $+50^\circ\text{C}$
(-4°F to $+122^\circ\text{F}$).

Materials/colour

Housing: Black PVC.

Rotor: Electro-polished
stainless steel (AISI 303).
Conical wind catcher.

Bearings: Ball bearings.

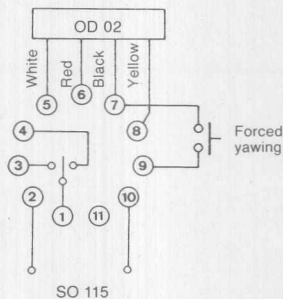
Thread

External thread:
M 28 x 2.
With one nut.

Weight

App. 350 grams.

WIRING DIAGRAM



MODE OF OPERATION

Wind vane (anemoscope), type OD 02, for relative wind direction is placed on the top of a windmill, and used in conjunction with S-system, type SO 115 for the control of yawing wind-driven generators (windmills) according to the actual direction of the wind.

OD 02 contains two Ga-As diodes, a coded disc, and two phototransistors with open collector.

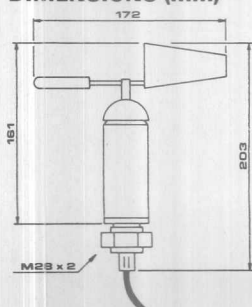
The wind vane is thus capable of registering and signalling deflections (above 7°) from the starting point as well as the direction (left/right) of such a change of wind by means of optoelectronic detection.

The OD 02 is supplied from SO 115 containing a relay with neutral centre position. Delay on yawing and time for yawing in

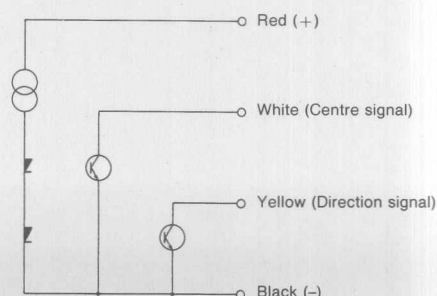
conditions of error are separately adjusted. See under the SO 115 for further data.

Mechanically the OD 02 consists of a wind vane in stainless steel, a rotor shaft with ball bearings, and a house in PVC.

DIMENSIONS (mm)



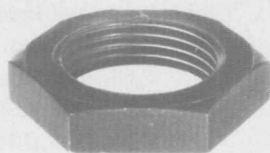
DIAGRAM



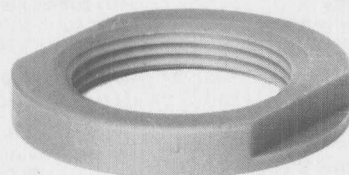
ACCESSORIES FOR PROBES/SENSORS

NUTS TYPE VM 0,5 - VM 1,0 and VM 1,5

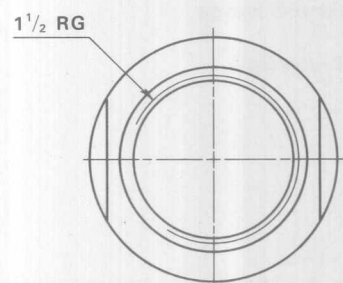
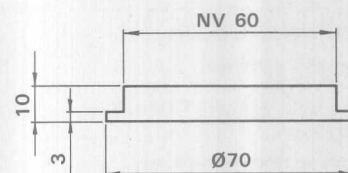
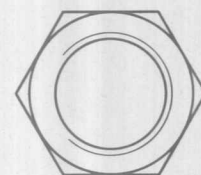
Nuts with $\frac{1}{3}$ " - 1" and $1\frac{1}{2}$ " pipe thread respectively.
For fixing of level sensors directly in thin container walls etc., or at other places where threading is not possible.



VM 0,5
VM 1,0



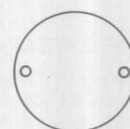
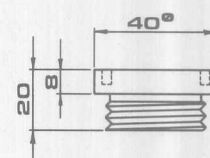
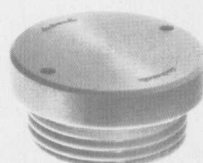
VM 1,5



CAP TYPE PPH

Optional cover for head of level probe type VPP.

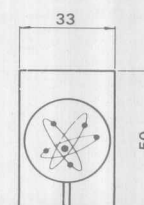
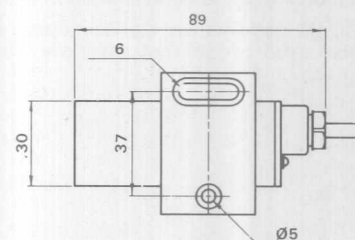
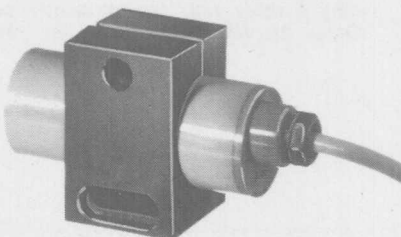
Material: Polypropylene.
Colour: Grey



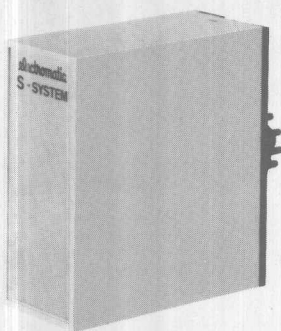
MOUNTING BRACKET TYPE DB 1

Mounting bracket for inductive, capacitive and optical proximity sensors with the type number 10.

Material: Acetal.
Colour: Black



ACCESSORIES FOR PHOTSENSORS



SE 010

POWER SUPPLY SE 010

When photosensors operating with infrared, modulated light are used in conjunction with a S-system, normally both the transmitter and the receiver are connected to the same S-system, thus the SE 110.

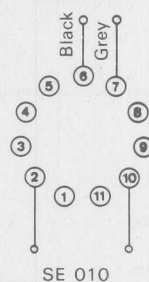
In cases where it is not easy or even impossible to connect the transmitter and the receiver to a common point, for instance where the transmitter and the receiver are placed far apart, in dif-

ferent buildings or on each side of a road, for instance for the purpose of traffic census, it is possible to use a separate power supply for the transmitter, thus the S-system SE 010. In that case, the receiver is connected as usual to the SE 110. Of course, both the SE 010 and the SE 110 must be connected to the mains. Two transmitters can be powered from one SE 010.

TECHNICAL DATA

Supply voltage:	24 - 120 or 220 VAC \pm 10 %.
	45 - 65 Hz.
Consumption:	1 VA.
Ambient temperature:	- 20°C to + 50°C. (- 4°F to + 122°F).
Internal resistance:	15 Ω .
Idle voltage:	5 VDC.
Short-circuit current:	600 mA.
Nominal output:	Voltage: 3.5 VDC. Current: 100 mA. Ripple voltage: 30 mV _{pp} .

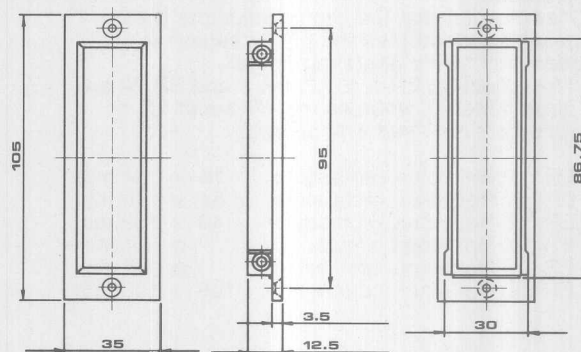
WIRING DIAGRAM



FRONT MOUNTING BEZEL TYPE FRF 1

Applicable for flush mounting of photosensors in »G-enclosure«. The front mounting bezel and the photosensor are screwed together through the standard mounting holes of the sensor.

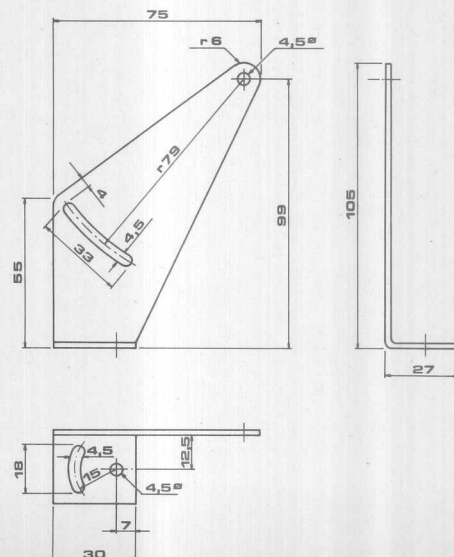
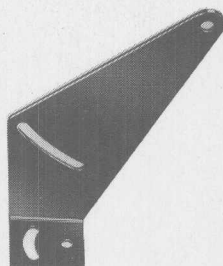
Material: POLYCARBONATE.
Colour: Black.
Panel cutout: 87 x 30 mm.



ANGLE BRACKET TYPE VB 2

Universal angle bracket to be used in conjunction with the photosensors, which are mounted in »G-enclosure«. By means of the bracket the sensor can be both twisted and tipped in all directions in relation to the fixing point.

Material: 2 mm, iron plate, electroplated.
Colour: Black.



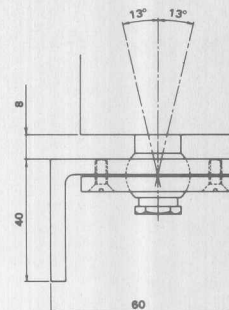
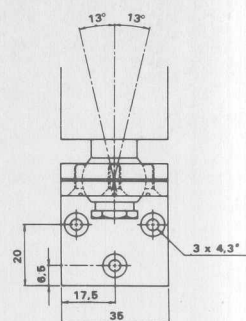
ACCESSORIES FOR PHOTOSENSORS

Ball-and-socket joint mounting bracket KB 1

This cast metal mounting bracket, made of black aluminium, can replace the stiff sheet metal bracket which is always used in conjunction with the standard execution of photosensors encapsulated in the E-type enclosures.

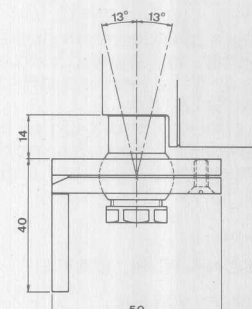
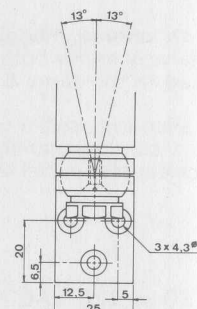
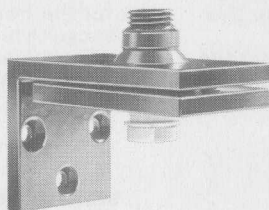
The ball-and-socket joint mounting bracket permits the enclosure to be twisted and to be tipped in relation to the point at which the bracket is fixed.

Note: Watertight (IP 57) photosensors in E-type enclosures are always delivered with the KB 1 mounting bracket.



Ball-and-socket joint mounting bracket KB 2

This cast metal mounting bracket, type KB 2 is used in conjunction with transceivers in »G-enclosures«. The ball-and-socket joint mounting bracket, made of black aluminium, permits the »G-enclosure« to be twisted and to be tipped in relation to the point at which the bracket is fixed.



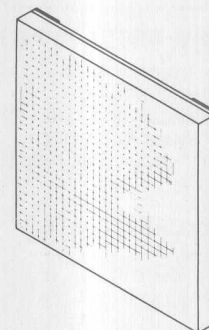
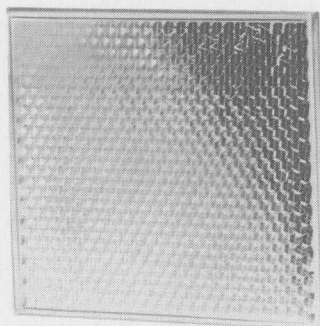
Reflectors type ER

ER reflectors are used in conjunction with the photosensors described in this catalogue. For each type of sensor, the maximum operating range in conjunction with an ER 22 reflector is stated.

Please note, that the use of reflectors with smaller surface than the ER 22 causes a reduction of the operating range.

The reflectors ER 1, ER 2, ER 5 and ER 22 are to be adhered, whereas the ER 3 and ER 4 reflectors are fixed with screws.

ER 1	Reflector, rectangular	18 × 54 mm
ER 2	Reflector, rectangular	54 × 80 mm
ER 3	Reflector, rectangular	40 × 180 mm
ER 4	Reflector, circular	∅ 84 mm
ER 5	Reflector, circular	∅ 32 mm
ER 22	Reflector, square	100 × 100 mm



DIGITAL TIMER CONTROL

On some of the timers and recyclers, two of the pins are reserved for connection of a Digital Timer Control (D.T.C.), and are therefore used only during exact timesetting.

Both models, CL 4010 (powered from an external AC source) and CL 3520 (powered from an internal, rechargeable battery), measures the duration of one single oscillator-pulse, being proportional with the set time.

The actual range of the S-system (seconds, minutes or hours) must

be selected accordingly on the D.T.C. The S-system and the D.T.C. must be interconnected with two test leads, which plugs into the D.T.C.

If the S-system is connected to its supply voltage and the time is under expiration, the set time shall be displayed within a few seconds with a resolution of 1/10 of a second, minute or hour respectively.

All S-systems suitable for use with a D.T.C. are labelled with an indication of which pins are to be connected to the D.T.C.

DIGITAL TIMER CONTROL TYPE CL 4010

Mains operated.
With LED-display.

TECHNICAL DATA

Supply voltage:

24-120 or 220 VAC $\pm 10\%$, 45-65 Hz.
The supply voltage and the measuring terminals are galvanically separated.

Consumption:

5 VA.

Ambient temperature:

0°C to + 40°C.

Display:

4 digit, 7 segment LED, 7.6 mm high.

Ranges:

Seconds, minutes and hours.

Range selector:

Built-in rotary switch at the front of the instrument.

Mechanical dimensions:

Panel model, type CL 4010 B.
Panel cut out: 96 x 46 mm
Front frame: 100 x 50 mm
Mounting depth: Approx. 115 mm, incl. plugs.

Table model, type CL 4010 C.
Front frame: 100 x 50 mm.

Material/Colour, housing:

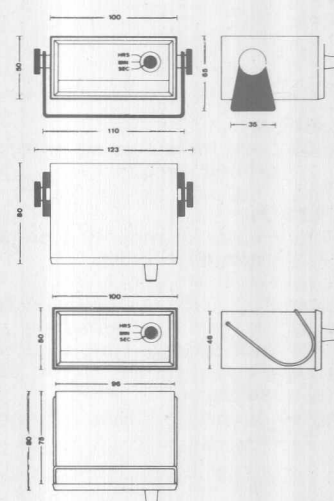
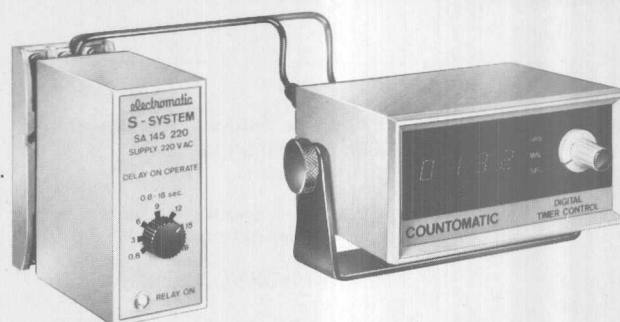
ABS/Grey.

Material/Colour, front plate:

Polarized red plexiglass.

Weight:

400 grams.



DIGITAL TIMER CONTROL TYPE CL 3520

Built-in battery operated.
With LC-display.

TECHNICAL DATA

Supply voltage:

Built-in rechargeable nickel/cadmium battery.
Voltage: 4.5 VDC.
Capacity: 40 mAh.

Consumption:

5 mW.

Ambient temperature:

0°C to + 40°C.

Display:

3 1/2 digit, 7 segment LC, 12.7 mm high.

Ranges:

Seconds, minutes and hours.

Range selector:

Built-in switch at the front of the instrument.

Operating time:

40 hours.

Charging time:

14 hours.

Indication of discharged condition:

Display changes when in use into 00.0.

Mechanical dimensions:

Height: 120 mm
Width: 65 mm
Depth: 40 mm.

Material/Colour, housing:

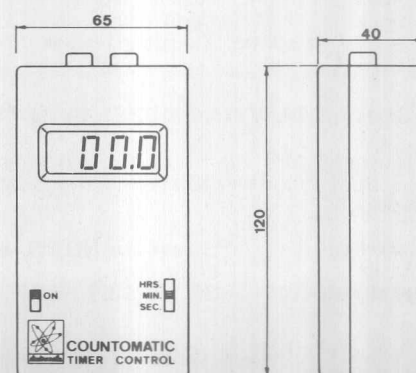
POLYSTOROL 454 H.
Front part: Light grey.
Rear part: Dark grey.

Weight:

200 grams.

Accessories:

Charging unit type MT 46 for 120 or 220 VAC supply.



ACCESSORIES FOR S-SYSTEM

BASES

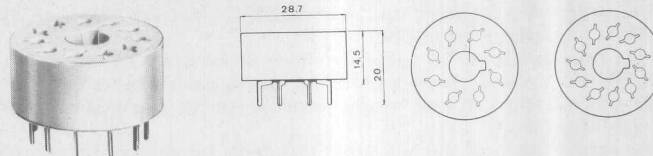
S 008

8-pole base for printed circuits.

S 011

11-pole base for printed circuits.

Material: Glassfilled NORYL SE 1.
 Colour: Light grey.
 Material of spring: Tin-plated brass.
 Dividing circle: S 008: 20.5 mm - S 011: 22.0 mm.
 Hole diameter of printed circuit: Min. 1.5 mm.



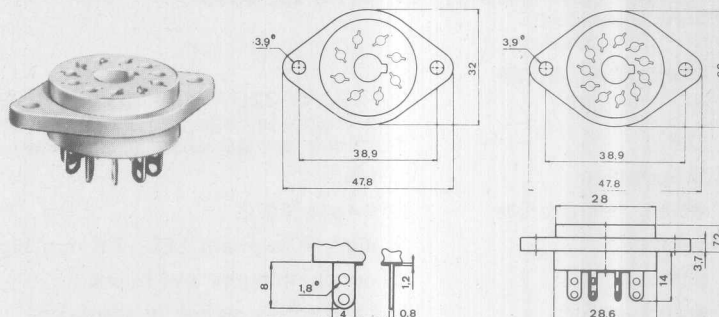
S 108

8-pole base for mounting on or below a chassis with soldering- and plug connections. (AMP 187).

S 111

11-pole base for mounting on or below a chassis with soldering- and plug connections. (AMP 187).

Material: Glassfilled NORYL SE 1.
 Colour: Light grey.
 Material of spring: Tin-plated brass.



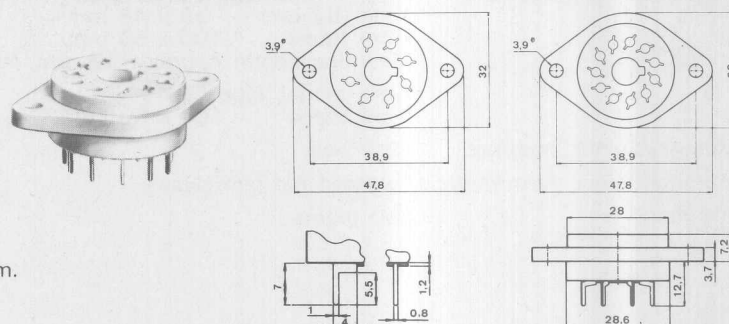
S 108 A

8-pole base for mounting on or below a chassis. For printed circuits.

S 111 A

11-pole base for mounting on or below a chassis. For printed circuits.

Material: Glassfilled NORYL SE 1.
 Colour: Light grey.
 Material of spring: Tin-plated brass.
 Dividing circle: S 108 A: 20.5 mm - S 111 A: 22.0 mm.
 Hole diameter of printed circuit: Min. 1.5 mm.



S 408

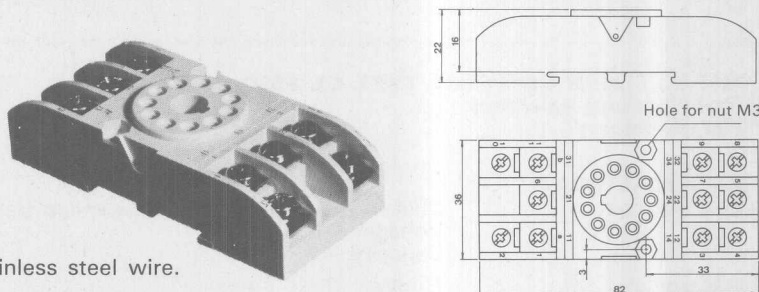
8-pole base with front screw connections.

S 411

11-pole base with front screw connections.

Both types are intended for mounting by 2 screws or for snap-mounting on DIN-rail (DIN 46277), and have captive cable clamps and cross cut terminal screws.

Material: NORYL SE 1.
 Colour: Light grey.
 Material of spring: Tin-plated brass.
 Material of retaining spring for mounting on DIN-rail: Stainless steel wire.



S 908

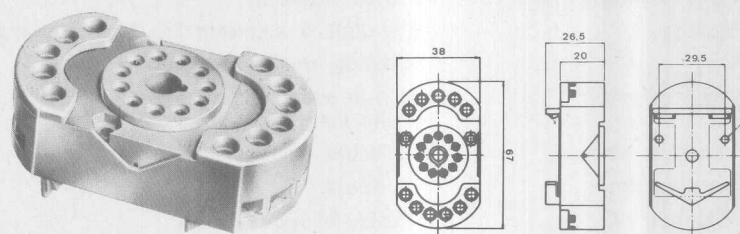
8-pole base with front screw connections.

S 911

11-pole base with front screw connections.

Both types are intended for mounting by 2 screws or for snap-mounting on DIN-rail. (DIN 46277).

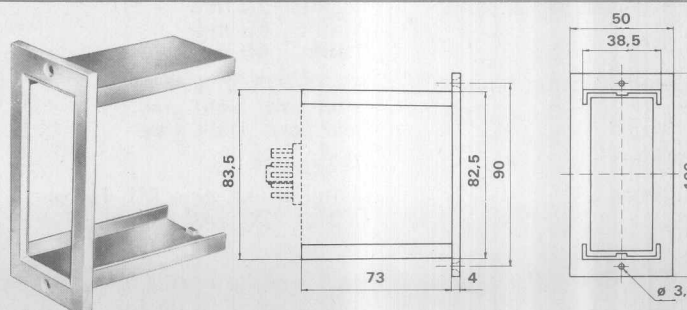
Material: NORYL SE 1.
 Colour: Light grey.
 Material of spring: Tin-plated brass.



FRONT MOUNTING BEZEL TYPE FRS 2

For front panel mounting of S-systems.
 The front mounting bezel and the S-system snap together.

Material: Glassfilled NORYL SE 1.
 Colour: Light grey.
 Panel cutout: 82.5 x 38.5 mm.

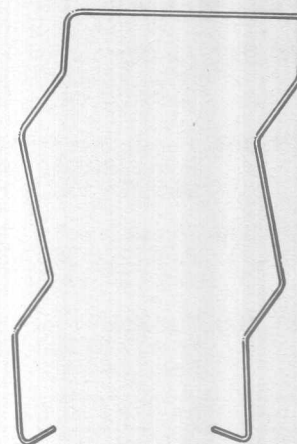
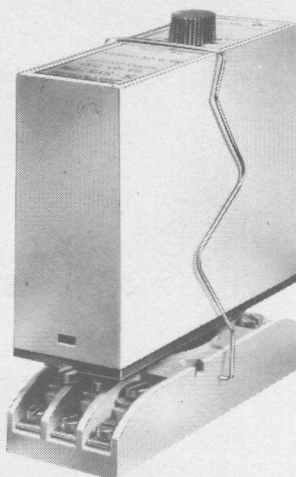


ACCESSORIES FOR S-SYSTEM

HOLD DOWN SPRING TYPE HF

To be used in conjunction with base types S 411 or S 911 for additional fixing of the S-system in places with strong vibrations.

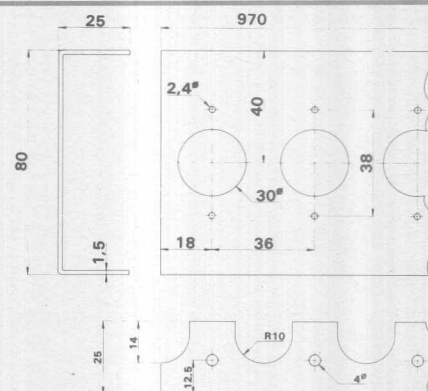
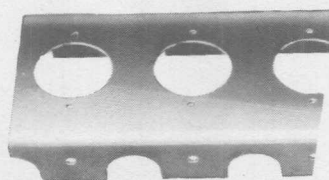
Material: Stainless spring wire.



MOUNTING RACK TYPE SM 13

Mounting rack intended for 27 S-systems.

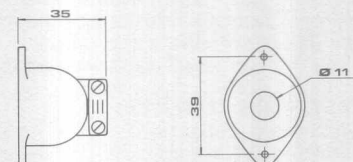
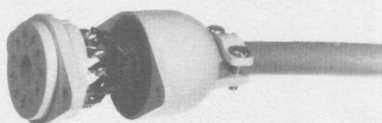
Made of 1.5 mm electroplated iron.
Standard length: 970 mm.



BASE COVER TYPE BB 1

For cover of terminals of bases type S 108, S 111, S 108 A and S 111 A.

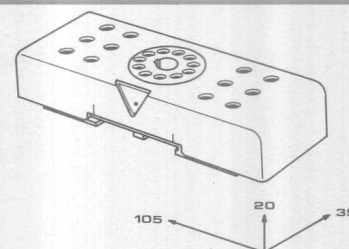
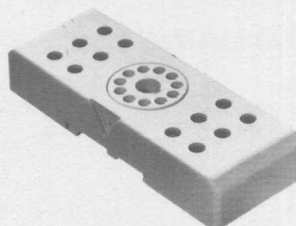
Material: NORYL SE 1.
Colour: Light grey.



BASE COVER TYPE BB 4

Cover for base types S 408 and S 411.
Intended for covering of the front screw connections of the base.
The holes (Ø 5 mm) above the terminals exclude accidental touching, but permit measurements without removing the base cover.

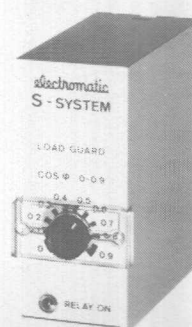
Material: NORYL SE 1.
Colour: Light grey.



POTENTIOMETER LOCK TYPE PL 1

For the locking of potentiometer on knob-adjustable S-systems.
The potentiometer lock snaps to the front of an S-system, and when a potentiometer is placed in the aperture of the lock, the setting of a knob-adjustable S-system is secured.

Material: Transparent polycarbonate.
Size: H × W = 16 × 35 mm.



ACCESSORIES FOR S-SYSTEM

TRANSFORMERS

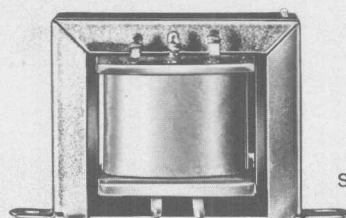
ST 012 Transformer for 5 S-systems.
Prim.: 220/380 VAC.
Sec.: 24 VAC - 0.5 A.

ST 024 Transformer for 10 S-systems.
Prim.: 220/380 VAC.
Sec.: 24 VAC - 1 A.

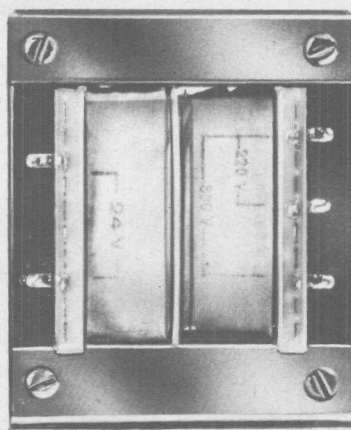
ST 050 Transformer for 20 S-systems.
Prim.: 220/380 VAC.
Sec.: 24 VAC - 2 A.

ST 100 Transformer for 40 S-systems.
Prim.: 220/380 VAC.
Sec.: 24 VAC - 4 A.

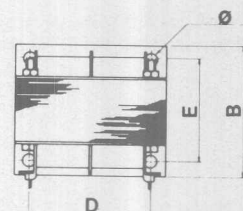
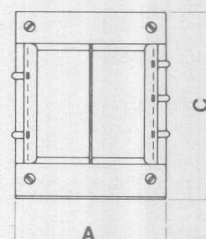
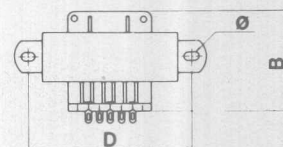
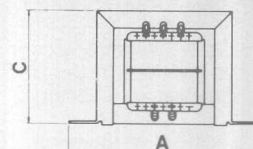
Type	A	B	C	D	E	Ø
ST 012	87	45	53	75		3,5
ST 024	50	60	62	33	48	3,5
ST 050	70	64	87	57	48	5
ST 100	80	75	100	64	64	5



ST 012



ST 024
ST 050
ST 100



INSTRUMENTS

Moving-coil instruments for indication of temperature/revolutions/wind speed/voltage/current by use of amplifiers and relays.
See the individual catalogue pages.

TECHNICAL DATA

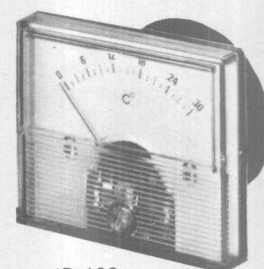
Full scale deflection: 1 mA
Internal resistance: Type ID 120: 110 Ω
Types ID 270-IDM 270: 300 Ω

Mechanical dimensions: Type ID 120

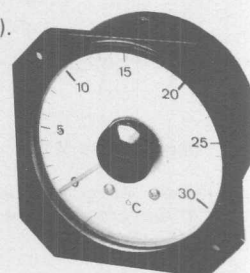
Front frame: 42x48 mm (h x w).
Panel cut out: Ø 38 mm.
Mounting depth: 33 mm.

Types ID 270-IDM 270

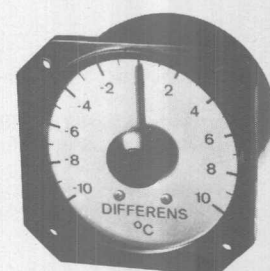
Front frame: 83x83 mm.
Panel cut out: Ø 80 mm.
Mounting depth: 55 mm.



ID 120



ID 270

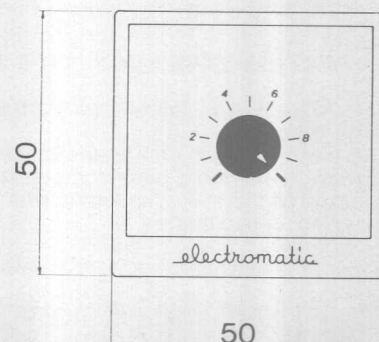
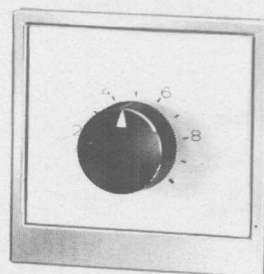


IDM 270

REMOTE POTENTIOMETER KIT TYPE PK

Front plate and linear potentiometer for panel mounting.

By ordering: Specify potentiometer value.



ELECTROMATIC's catalogue on S-SYSTEMS



Includes:

Electronic timing relays and recyclers

Relays for inductive/capacitive proximity sensors

Level control relays

Relays for photosensors

Current-voltage:
Monitoring relays & indicators

Phase failure and $\cos \varphi$ relays

Frequency relays

Relay for detection of gases

Temperature control relays

Relays for temperature sensors

Wind metering relays

Pulse relays and counters

Logic relays.

ELECTROMATIC's MANUFACTURING PROGRAMME

COUNTOMATIC

Pulse counters
Pulse-difference and position counters
Pulse counters with pre-selection
Pulse counters with pre-selection and slow-down
Ammeters (AC/DC)
Voltsmeters (AC/DC)
Frequency meters
Digital timer controls
Tachometers
Synchro clocks
Stop watches
Thermometers
Encoders

COUNTOMATIC digital instruments with LED display.
The instruments are available for either panel- or table top models.
AC supply voltage.



Counters/meters according to DIN 43700

Totalizing counters, independent of external supply (inputs for contact/open collector/AC and DC voltage impulse).

Meters/counters, AC/DC supply.

For use in conjunction with exchangeable input modules determining the function of the Countomatic system which is also available with pre-selection and two outputs.

Input modules for the above-mentioned type. Functions: Counter, tachometer, temperature meter, a.o.

COUNTOMATIC counters/meters with readable 4- or 6-digit LCD display.

This range is for panel mounting according to DIN 43700

(96 × 48/96 × 96 mm).



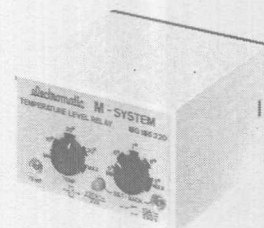
M-SYSTEM

Electronic timing relays and recyclers
Relay for proximity sensors
Relay for photosensors
Relay for temperature sensors
Logic relays
Current-, voltage-, phase-, and frequency relays
Level control relays
Air humidity and twilight relays
Temperature control relays for central heating systems
Remote controlled relays:
By radio transmitter
By infrared transmitters

The M-SYSTEM is electronic automation units intended for DIN-rail mounting in installations and switch boards.

The system is fitted with 11-pin socket.

Dimensions: 45 × 70 mm (H × W).



TELEPHONE ALARM/CONTROL SYSTEM

Remote monitoring/control via the public telephone network.

Supply: 12 VAC.

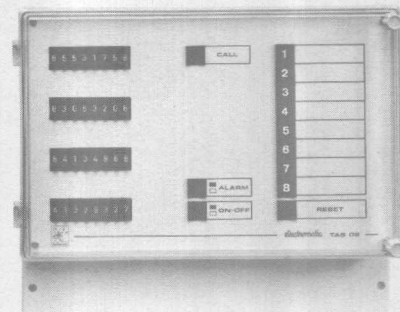
Dimensions: 30 × 25 × 12 cm.

TAS: Telephone Alarm System.

TAS is a complete alarm centre for 2 or 8 inputs. The TAS calls 1 or 4 pre-selected telephone numbers on alarm.

TCS: Telephone Control System.

TCS makes operation of 2 or 10 functions possible by call.



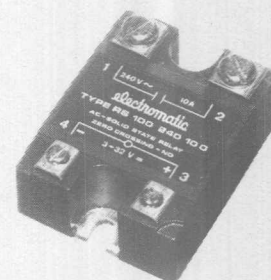
R-SYSTEM

SOLID STATE RELAYS with opto-isolation for switching AC loads up to 40 A and 440 V.

Zero-voltage or instant turn on,

Switching modes NO or NC.

Screw terminals or pins for PCB mounting.



T-SYSTEM

Time units

Units for various sensors

Level control units

Logic units

Current-, voltage units

Dividing-, decade-, and tachometer units

Power outputs for AC/DC

The T-SYSTEM consists of all-electronic mini circuit blocks with two antivalent 200 mA outputs.

Supply voltage: 10-40 VDC.

